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Studies in Subject Didactics 13

CHANGING SUBJECTS, CHANGING PEDAGOGIES: DIVERSITIES IN SCHOOL AND EDUCATION

Edited by
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FOREWORD

We have put together this volume to mediate the current state of research within subject pedagogy. This branch of educational research goes by many names, such as research on subject education, subject didactics, or pedagogical content knowledge—this is to say nothing their full or part synonyms in other languages (for example, "ainedidaktiikka" in Finnish, "ämnesdidaktik" in Swedish, or "Fachdidaktik" in German). "A beloved child has many names", says a well-known proverb, and in this volume we want to apply this notion in introducing this intriguing field of research.

The present volume has its roots in a Nordic conference that was held in Finland in May 2015. NoFa5 marked the fifth conference on subject pedagogy to be held in the Nordic countries. Starting as a small event in 2007, it has grown into a lively academic forum, not only for Nordic researchers but for researchers from all over the Europe and beyond. This tells us that Nordic perspectives within subject pedagogy are tempting to scholars working on education in other countries. As a consequence, the present volume includes studies from the Nordic countries as well as from other European countries. In Europe, there are ongoing social changes related to diversity on many levels. This volume addresses some challenges and opportunities of these societal changes and will hopefully open up fruitful discussion on education for the future.

For many researchers of education, talking about subject pedagogy sounds old-fashioned. The world has changed, there is information available everywhere; why should we be interested in research in learning and teaching of any content when the information is right there, just a click away on a smart phone or computer? Indeed, it seems more important to talk about skills and competences, about "learning to learn", about "general competence" and "21st century skills". However, in this volume, we argue that the general competences line of thinking is old-fashioned. Using a GPS navigator, you may ride out of a strange territory, but you will only have a narrow view. Using a map, you can understand where you are and gain a wide angle over the territory. It is hard to learn to use the map, as it is hard to learn any subject knowledge. However, while using clicked information from a smart phone may help you to solve a sudden problem, without any knowledge about facts and the logic, reasons, and consequences grounded on these facts, you are still lost in the sea of information. Subject pedagogy is the map for learners to find their own ways of thinking rationally, creatively, and powerfully in the middle of contested information.

At stake here is what David Lambert, in his contribution to this volume, calls powerful disciplinary knowledge. This knowledge enables learners to use their intelligence, creativity, intuition, and feelings in ways that enrich their own life as well as that of their communities and societies. In this volume, we introduce studies that are inspired by the principle of making powerful disciplinary knowledge available for all learners. When the world changes, when the societies and environments around us change, the pedagogies to mediate powerful disciplinary knowledge change too.

The publications within the field of subject pedagogy are usually spread into different fora: studies are typically published in dedicated volumes or journals, usually for only one or two fields of subjects. In contrast, this is a volume where a wide range of different fields of subject pedagogy—from science to reading literacy, from mathematics to poetry didactics—are presented together so as to emphasize the importance of the diversity and changes in pedagogies. This allows readers to get a wider picture of the area of subject pedagogy, and offers researchers, teachers, students, and other actors in the different subject fields a possibility to learn from each other. To make this apparent for the readers, each chapter highlights the implications of the research for policy-making and teaching practice.

The chapters in the volume also reflect the diverse range of the topics, theoretical approaches, and methods of contemporary research on subject pedagogy. In 1986, Shulman introduced the concept of pedagogical content knowledge (PCK), which identified the specific character of "subject pedagogy" in contrast to "general pedagogy". PCK was defined as representing teachers' knowledge that is generated as a combination of disciplinary, subject specific knowledge, and general pedagogical knowledge. The leading idea of PCK includes "the ways of representing and formulating the subject that make it comprehensible to others" (Shulman 1986, 9). Pedagogical content knowledge also involves understanding students' difficulties—why certain topics are difficult to learn. It is plausible that in every discipline (or school subject) there are traditional topics, standard representations, analogies, illustrations, examples, and demonstrations—that is, standards. However, contributions in this volume may question the traditional hegemony of these standards, asking for new focus on the content to be taught, the ways of organizing traditional content, and the creation of new ideas for the purposes of inspiring and motivating learners in their changing world.

This volume begins with a chapter by David Lambert, wherein he rethinks content knowledge, particularly within geography, by introducing and

developing the idea of powerful disciplinary knowledge. He criticizes the competence or skill based curriculums and emphasizes the idea of knowledge as a powerful resource for learners. Powerful disciplinary knowledge allows students to understand entities in the world in ways that go beyond everyday experience and provides tools for them to tackle with a wide variety of problems. Lambert challenges the perspective, from meta-level, general educational, to the concrete subject pedagogical rights of students to gain a diverse range of knowledge and core tools for understanding the world and have a vision for the future.

Learning powerful disciplinary knowledge also means gaining skills for the literacies that enable students to enter into new territories of knowledge. It is precisely these different kinds of literacies that are at stake in the first part of this volume. In the field of history education, Bengt Schüllerqvist highlights the fact that history education is intimately related to the production of nation. He sees nation-building as an ongoing process and suggests that understanding this helps in grasping the political pre-conditions for any history curriculum. Historical literacy thus consists of the ability to analyse the on-going discourses in society. Studying the development of pedagogical discourses on the role of physical geography in German journals for geography teachers, Anke Uhlenwinkel and Péter Bagoly-Simó analyse the justifications for teaching proposals on "volcanos" and "weather" over a 30 year period. The goals and the expected geographical literacy skills have changed dramatically during this period, and the authors analyse the reasons for these changes, from the theoretical to the pedagogical to the political. Yvonne Behnke further explores aspects of geographical literacy, using eye-tracking technology in order to understand how students perceive graphical representations in geography textbooks. Since graphicacy is a crucial competence in geography, it is important to understand how graphics are attended to and how they should be designed in curriculum materials, such as textbooks. Investigating literacies in history and first language education with a focus on critical literacy skills, Elina Kouki and Arja Virta analyse secondary school students' abilities to use historical and other sources of information in writing an essay. The students' written essays, along with post-essay interviews, revealed that there were severe gaps in their critical literacy skills, resulting in the authors' call for new kinds of activities that would help students strengthen their critical literacy skills.

The second part of the volume deals with linguistic interaction, both in spoken and written form. Critically and systemically reviewing 21st century Finnish studies on writing in basic education, Pirjo Kulju, Merja Kauppinen, Mari Hankala, Elina Harjunen, Johanna Pentikäinen, and Sara Routarinne observe that research on writing has been more focused on developmental issues

in early literacy or individual students' skills with printed texts than with writing processes or the creative sides of writing that both require and benefit from interaction with co-writers and teachers. According to the authors, it is possible to develop inspiring pedagogies by connecting linguistic, cultural, and social diversity aspects to the research on writing literacy. In a study focusing on mother tongue education, Liisa Tainio analyses classroom interaction and student interviews to reveal the influence of textbook use on classroom interaction and participation. The textbook is not a corpus of knowledge, but a trigger for students to interact with disciplinary knowledge. She suggests that it is particularly important for student motivation that the teachers use clear metatextual instructions, uptakes, and elaborations of pupil responses, as well as references to mutual learning history and learning strategies to keep a sufficiently high level of academic demands within classroom discourse. Meanwhile, Friederike Kern, Thomas Rottmann, and Sören Ohlhus highlight the importance of language and embodied interaction in the learning process by analysing the learning of basic arithmetic concepts, such as number reference, in primary school children with severe learning difficulties. Arithmetic can be considered a highly defined body of knowledge. Therefore, there is a risk to organizing teaching and learning in ways that leave students only the role of an adopter of knowledge. Emphasis on language and embodied practices makes it possible to change the learning event into a situation where students are involved in embodied interaction with the meanings of the concepts to be understood. Embodied interaction is also important in the chapter by Daranee Lehtonen and Jorma Joutsenlahti, in which the authors introduce a methodology that they have designed to enhance students' conceptual understanding, one of the most important proficiencies in mathematics. Students applied manipulatives in making connections between various mathematical representations, a process by which the students became involved in interaction with disciplinary meanings. This is subsequently demonstrated to be helpful for students and appears thus to have improved learning.

In contemporary educational environments, gaining literacies in multimodal conditions has become important. New ways of organizing pedagogies, with the help of digital media, not only improves students' technical skills but also gets learners to interact with the disciplinary knowledge in new, open, and innovative ways. Raffaele Brahe-Orlandi and Ove Nielsen report on their design-based research in which they developed pedagogies for students to transduce the meanings of poems into poetic short films. They see great potential in the kind of pedagogical designs that develop student competencies in both the "traditional" disciplinary knowledge of understanding poetry—and the characteristics of lyrics—and the "new" disciplinary knowledge of producing multimodal texts. Satu Grünthal and Johanna Pentikäinen have also designed a

pedagogical activity in transduction, where students script and produce book trailers for studying literature. In this pedagogical design, the students themselves were pushed to study the ways in which literary knowledge is mediated into a wide range of multimodal meanings through the interpretation of the poem that then leads to a trailer production. The authors see this pedagogical method as evoking students' reading motivation and reading skills as well as promoting team-building and cooperation abilities, all of which are strongly needed in today's diverse communities. Following the question of diversity, Peter Degerman addresses questions concerning the possibilities of modernist and postmodernist avant-garde poetry as a democratic tool in the classroom. Suggesting ideas of poetry in play and of differential readings, the chapter implies that specific types of literature call for specific methodologies. He argues that an attentive and collective reading of experimental contemporary poetry enables the creation of a zone of free play in the classroom, democratic in its construction of a knowledge that is based on the sensuous aspects of art.

While deciding on the content to be learned at school, it is important to remember that learning itself needs to be evaluated. Parents have the right to know what and to what extend their children learn at school. Further, there is a need for fair criteria in selecting students for advanced studies or programs. In the final part of this volume, assessment is explored in reference to subject pedagogies. In their chapter, Raili Hildén and Juhani Rautopuro compare school grades, as assigned by the teacher, to the achievement test results gained in the national large-scale assessment study on linguistic skills in foreign languages in Finland. In studying Swedish, German, and English assessments, they found that in some areas of language proficiency (i.e. writing, speaking, and listening) grades and national test scores correlated higher than in other language proficiency areas. To improve equality between students in different schools, they recommend more specific assessment criteria in good mastery for teachers to follow. Juhani Rautopuro and Elina Harjunen tackle with another aspect of large-scale assessment tests. They compare students' achievements in traditional pen-and-paper test to student achievements in digitalized test with the same content. They found that students who completed the assessment test via computer performed lower than students that used pen and paper. Referring to their results, they argue that digital tools require different kinds of assessment items as well as a rethinking of pedagogical methods and contents. Focusing on powerful disciplinary knowledge would be a fruitful approach to decrease tension between goals and assessment.

There is a lot of literature on diversities, but they are not often studied from the perspective of subject pedagogies—though this is, in fact, the framework where diversities are taken into the practice. The range of different

pedagogies and methodological perspectives combined with the wide range of subject fields makes this volume unique. However, in the last chapter, Fred Dervin asks whether practitioners and researchers of education use the concept "diversity" too loosely and too often. What are the meanings and values of this concept? In what ways should we see and talk about the "other"?

The aim of this volume is to look into the future and at the same time appreciate the obvious advances of contemporary pedagogies. Following classic pragmatists (e.g. Dewey 1980) and late cognitive science (e.g. Johnson 2007), the research on subject pedagogies wants to emphasize the interaction between body and environment. Johnson postulates that "Change your brain, your body, or your environment in nontrivial ways, and you will change how you experience your world, what things are meaningful to you, and even who you are" (Johnson 2007, 1–2). According to this embodied view of cognition, meaning is grounded in bodily experiences. The implication of this for subject education lies not only in the importance of interaction between individuals, and between individuals and pedagogical artifacts, but also between individuals and disciplinary knowledge. It is not enough for teachers to simply show or demonstrate representations of certain concepts to students. More is needed. Students must themselves be involved in embodied interactions with the artifacts conveying meanings and contents of disciplinary knowledge. Even in this volume, several chapters focus on a range of novel ways to orchestrate students into interaction with different kinds, parts, and entities of disciplinary knowledge in verbal, embodied, and multimodal means. This may require researchers and practitioners to rethink both the content to be learnt and the activities in which learners are instructed to be involved.

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Introduction

CHAPTER ONE

POWERFUL DISCIPLINARY KNOWLEDGE AND CURRICULUM FUTURES

David Lambert

Introduction

The overarching theme of this chapter is a concern with the future of schools in contemporary society, or more precisely the future school curriculum (e.g. Young and Lambert 2014). The chapter presents an argument for a progressive knowledge-led curriculum, and thus makes a case for subject specialist teaching in schools. A lay member of the public, someone looking at education from the outside, might be astonished that such an argument needs to be made. But it does, and this chapter takes some time to analyse why this is the case. In doing so, I set up the "three futures" heuristic first introduced by Young and Muller (2010) and developed for a professional audience by Young and Lambert (2014). This device initially distinguishes Future 1, which can be characterized as a curriculum of the transmission of given and inert facts, from Future 2, which is the skills-based alternative endorsed by such beguiling phrases as "learning to learn" or the development of "twenty-first century skills". In relation to this schematic, Future 3 in essence asks how schools and teachers should respond to what we could call "Future2ism," which appears to be the most influential "progressive" educational ideology today but which, Young (2008) argues, undermines specialist teaching in schools.

Though firmly rooted, albeit implicitly, in Anglo-Saxon traditions of curriculum studies, my argument intersects with Central and Northern European traditions of subject specialist didactics. This is particularly the case with this chapter's main point, which is to explore the "pedagogic right" (Bernstein 2000) of all young people to be given access to what Michael Young has called "powerful" specialist disciplinary knowledge (Young 2008). The notion of powerful disciplinary knowledge (PDK) underpins Future 3 thinking, and this chapter argues for the adoption of a Future 3 curriculum as a goal to work towards. From the outset it is important to note that Future 3 is a way of conceptualising the curriculum, not a recipe or set of techniques to adopt. It enables the process of "curriculum making"[1] by focusing first and foremost on why teaching geography (or any other specialist subject) is important and is, therefore, worth teaching. The question of how to teach this is then appropriate, with a strong sense of fitness for purpose. Pervading these questions—which tend to be reversed in

Future2ism (in which the "why" question frequently doesn't get asked at all)—is the question of who are we teaching: "all children" is not precise enough, for the context of children's lives is significant in the practical art of teaching.

It almost goes without saying that to achieve the goal of Future 3 curriculum thinking in schools is highly ambitious. For one thing, it requires highly trained and well educated specialist teachers. This raises an urgent and profound problem, for, in my country at least, successive governments have been involved in de-institutionalising teacher education and training—in short moving the preparation of teachers from universities to schools. This is not the place to open up this issue in any detail, but it is worth noting that in arguing for a Future 3 curriculum, this chapter is, in effect, calling for the careful re-appraisal of the "subject specialist" professional knowledge-base of teachers. Giving teacher preparation to schools makes a lot of sense if you believe teaching to be a set of technical and generic competences designed to facilitate learning. This chapter explains why I find this to be a depressing and limited vision for education, and ultimately, I hope the argument will also help us raise our sights (and our collective spirit).

The rise and rise of Future 2

One reason why arguing for a knowledge-led curriculum is challenging today is that knowledge appears to have acquired a bad name, even among teachers. We tackled this in our 2014 book, *Knowledge and the Future School: Curriculum and Social Justice* (Young and Lambert 2014):

> "Throughout this book we have been acutely aware that many teachers find it less than comfortable to talk about knowledge lest it betrays them as traditonalists fixed on what we call a Future 1 vision of their work, lacking in creativity and relevance. This often rests on a restricted conception of knowledge where it is taken to mean superficial facts …" (160)

Most of the teachers I know are very keen to distance their teaching from traditional notions of educational encounters that see the relationship as basically transmissive. Metaphors abound, such as the deficit view of the child's mind being an "empty bucket" waiting to be filled. Most British teachers are versed well enough in their cultural heritage to have a visceral distaste for Charles Dickens' Gradgrind[2]. Armed with twentieth century learning science, from Dewey to Vygotsky, most teachers are now broadly constructivists: we know that students' talk is important; we know that manipulating data and learning

by doing are powerful; we know a lot about engagement and motivation; and we know, most profoundly, that all knowledge is socially constructed. These are more than adequate grounds on which to reject Future 1 curriculum thinking, which is characterised by the "delivery" of authorized, "given" and predetermined contents that need to be memorized by the student and reproduced in a test. Future 1 pays little attention to the source of this knowledge, how it has been produced and/or validated and does not encourage the thought that it may be contested—or even that there may be competing ideas, explanations, and theories.

Future 1 thinking can be rejected on a number of grounds, therefore, but in truth remains remarkably resilient throughout the world. It could even be thought of as the default position of school systems—and in conservative policy circles can even be part of an imagined, rose-tinted past that merely confirms what has been lost though recent political and social change and which needs to be restored[3]. This may explain the alacrity with which educationists and leftish policy makers often align with what is assumed to be "the" alternative to Future 1, which we have called Future 2. Thus, schools often "look" very different these days: indeed, as an educator (though speaking entirely for myself) one can feel like an existential outsider when one enters newly built schools and academies in England, for they look spacious, open and welcoming in a way that resembles a post-modern workspace in the world of commerce or advertising more than than a traditional place of learning. I have no problem with this *per se*. And yet, what goes on behind the classroom doors of even the most futuristic building is, according to some commentators such as Ken Robinson in his famous TED Talk on "creativity"[4], little different from what we have come to expect from the earliest state provided school systems. That is, teachers talking a lot, pupils listening and writing a lot and the whole business driven by the need to sort and grade young people for the workforce. Thus, despite a culture of innovation and competition having been introduced into the school system (notably through league tables and "academization": e.g. Butt and Lambert 2014), the "curriculum" has frequently been damned in recent times as fundamentally nineteenth century, or Fordist. The school curriculum is regularly condemned as completely unsuited to the needs of the today's information society—or more precisely, as we shall go on to discuss, the demands of twenty-first century, fast capitalism.

There is more than a little irony in this perceived "failure" of schools and, by implication, the teachers who work in them, whose role it is to enact or "make" the curriculum as it is experienced by students. This is because most schools are "explicitly" concerned with preparing children for their adult lives and "their futures". And as Fred Inglis remarked some 30 years ago, "the

curriculum is a message to and about the future" (Inglis 1985). But, as Matthewman and Morgan (2014) clearly show, mainly in the context of New Zealand, where "Future-focus" is recognized as one of eight curriculum principles (Bolstad 2011), not only is there deep confusion over what this really means but teachers find great difficulty in handling this enormous responsibility in practice—especially it seems, when it is wrapped up in terms of sustainability, citizenship, enterprise, and globalization. These four headings (it is not clear whether these are topics, key ideas, processes, or even subjects) *are* the future foci of the New Zealand curriculum, but for me they are examples of what Bill Marsden (1997) described as curriculum "good causes". These are, in his view, sociopolitical categories that need always to be kept in check as they have the potential to subvert or distort the curriculum experience into something that is less than educational and more like indoctrination. In terms of futures thinking in particular this danger is serious, for of course the future cannot be predicted with any great certainty.

This does not mean that education should ignore the future, but it does begin to illustrate how Future 2 thinking can develop and take hold, and give us something that we may not intend. In our eagerness to reject the rigidities of Future 1 (plus the acknowledgement of how challenging it can be to break free from Future 1), we embrace new agenda (such as the "future foci" of sustainability etc); we are encouraged to accept the logic of those like Ken Robinson who argue that school "educates children out of their creativity"—and innovate with alternative structures such as integrated subjects or problem-based learning; we replace subject with new confections—so for example, geography becomes geomedia and science becomes science literacy; we are undermined to the extent that we accept that we (teachers) are part of the problem—we need to do less of it; we celebrate learning more than teaching and imagine that transferrable, soft skills are superior to specialized knowledge.

Such is the rise and rise of Future 2 thinking. It is worth asking: in whose interests is the rise of Future2ism?

Versions of Future2ism and some implications

Possibly because of the self-evident truth that "children are the future" there is a substantial lineage to futures thinking in educational studies. Perhaps its heyday (in England) was during the period following the flush of optimism associated with the economic growth, social change—and recovery—after the Second World War. As Matthewman and Morgan (2014, 28) explain:

> "Futures education was closely linked to the emergence of 'new social movements' that challenged the direction of Western modernity and overlapped with an ensemble of 'adjectival studies' such as world studies, global education, peace education, development and environmental education (Dufour 1990). Important and representative texts include Pike and Selby (1988), Hicks (1988), Beare and Slaughter (1993), and Hutchinson (1996). These books reflect the concerns of the 1980s around nuclear war, environmental threats, and demographic change. They accepted the arguments of the 'new social movements' about the need to integrate the 'personal', 'political' and the 'planetary', and argued that schools should actively teach with a futures perspective since, paradoxically, schools did not provide students with the intellectual resources to think about, and actively create 'futures' (Slaughter 1988). An important feature of this literature concerned the role of teachers in curriculum change, finding ways to teach about possible, preferred and probable futures in principled and engaging ways (for a more recent statement, see Hicks 2012)".

"Futures" was an idea assumed to be of great interest and importance to teachers, as they were responsible for the curriculum "as enacted". However, futures-in-education discourses are now somewhat different. In a nutshell, the "new social movements" referred to in the above paragraph have been supplanted by even newer realities articulated by OECD's (2004) future schools scenarios and influential texts such a Keri Facer's (2011) *Learning Futures*. No longer is futures thinking concerned with classrooms and the "curriculum making" responsibilities of teachers but with system change which focuses on organizational matters and "twenty-first century learning": in the UK context, this is manifest in instances of educational entrepreneurial activity such a "Building Learning Power" (Claxton 2002), Creative Learning (whose website asks us to "stop thinking like a teacher!" and the RSA's Opening Minds initiative built on the notion of developing generic "competence" in young people.

Examples of educational innovation such as these can doubtless be found in educational jurisdictions around the world. They respond in a sophisticated yet common-sense manner to the universal and persuasive neoliberal argument that in the post-industrial age schools need to prepare young people for "knowledge society" (Gilbert 2005). There is an impressive level of consensus, not only around the world but also among different components of society—from the policy makers and educationists, to leaders in business, publishing, and technology (e.g. Pearson 2015; Cisco Systems 2012)—that education needs to be rethought along such lines, to produce "work ready" young people. This

repurposing of education was perhaps summed up well in England's National Curriculum aims of 2007 which stated that the purpose of school was to produce: confident individuals, successful learners, and responsible citizens[5]. The "big picture" vision of this curriculum promoted generic skills and competences, and promoted cross-curricular dimensions and themes above subject knowledge. It was endorsed by many, including one leading professional body, as in this representative if sometimes hyperbolic passage from a teachers' Trades Union (ATL 2009, 9):

> "We need to do things differently, and to do better, if we are to prepare young people for a world in which what is known to be true changes by the hour; a world in which access to information is at the touch of a keyboard, where rote learning of facts must give way to nurturing through education of essential transferable skills that enable the next generation to navigate the information age.
>
> That is why we advocate a skills-based curriculum. One that is focused on communication, physical, interpersonal and intrapersonal skills and thinking and learning skills; all essential components of the educated person able to think and act effectively in the twenty-first century".

The broad consensus or orthodoxy that I have sketched here is troubling in part because of what it does not say. The "skills based curriculum" referred to by the ATL, and the analysis of how to respond to the "information age", appears to promote individualism, wherein education becomes a form of consumption with strangely unambitious goals: the grand aims of confidence, success, and responsibility do little to help teachers select what to teach. Indeed, teaching is replaced by learning as the priority (students are even referred to now as learners). And as "facilitators of learning" teachers are to some large measure let off the hook, as they are able to relinquish decisions of what to teach (and why) to others and focus of the process of learning: this is the manifestation of what Gert Biesta memorably calls the "learnification of education" by which he means the translation of everything there is to say about education into a language of learning and learners (Biesta 2006, 14). It promotes choice under the banner of "personalisation" and a curriculum that is "tailored" to meet individual need. At the same time, it promotes a high pressure and high stakes system with little to insulate the individual student (or school) from the idea that "failure" is anything other than the result of lack of effort or lack of compliance. Adding to the pressure is the unspoken assumption that all can succeed and that social, economic, environmental, or cultural issues are irrelevant in explaining disadvantage or difficulty.

As an educationist, it seems to me that such orthodoxies—which accord very readily to the demands of contemporary fast capitalism: of flexibility, mobility, compliance, and individual responsibility—can be, and ought to be, contested, largely because they equate education far too closely to the role of key economic policy lever. This is not an easy position to adopt: indeed, how quaint it sounds today to even suggest that it is *not* the prime role of school to prepare children and young people for the world of work (or, that schools are very ill-equipped to do so). Today it is assumed self-evidently to be the case and that any other view of the purpose of schools is retrogressive, misguided, or stuck in a romantic liberal-progressive time warp. But for an educationist, the idea that "there is no alternative" is profoundly mistaken, for education should be concerned with enabling children to see things differently, to encounter hard-won and often difficult ideas, and to think in new ways. To develop David Wadley's (2008) metaphor, schools should not simply be going with the flow of the neoliberal "vibrant city" but consciously offer a "garden of peace" where deliberative thought can take place. This echoes Umberto Eco's interesting observation on educational reform: "Those in power need to understand that you have to be challenged to grow up" (Eco 2015, 4).

In the long term, it is also important to note that it is surely in the interests of capitalism and its ability to adapt and change, and for society to understand the need to regulate, control, and legislate to ensure its continuance, that young people are taught, in Bernstein's (2000, 30) words, how humankind has been able to "think the un-thinkable" and the "not yet thought".

Who are the children we teach?

All agree that society needs individuals who are educated. But educated for what purpose? My contention is that we need a bigger vision than the one economics, or more specifically the perceived needs of would-be employers, can provide. We should also note the broader circumstances in which children and young people are growing up. In Figure 1-1, I attempt to summarize some of the salient contextual issues of our time. These are indicative of the "real world" in which students and teachers live and we could doubtless discuss these matters at great length. For now, the only question I ask is simply this: how should schools—or more precisely, the school curriculum—respond?

Figure 1-1. Acknowledging some contemporary challenges

The digital age
- Information at your fingertips
- 24/7 news
- Computing power: e.g. geospatial technologies

Global 'threats'
- Asymmetric warfare and 'terror'
- Climate change
- Unregulated capitalism
- Enormous inequalities

Culture shifts
- Three minutes (concentration span)
- Selfies and celebrity ('famous for 15 minutes')
- Social media tyranny

This is not presented as a definitive list of issues. Its purpose is to illustrate some of the unavoidable 'pressures' that young people and their teachers face.

As I have noted, visionaries like Ken Robinson invest enormous faith in the innate potential that resides within each child. Children, he says in his TED talk, are born with "extraordinary powers of imagination, intelligence, feeling, intuition, spirituality, and physical and sensory awareness." We can agree with that unreservedly—children demand our unconditional respect. But respecting children requires more from us *as teachers* than simply acknowledging their potential as human beings. It is not to take a deficit view of childhood (as is sometimes argued) to say that children may benefit from being taught something. And it is dangerous to suggest (as Ken Robinson and others do) that being taught the plot of Macbeth, or how to solve simultaneous equations, or how the "demographic transition model" works (etc) is somehow to close down or neutralize children's creativity—rather than enable and release it!

Thus, being over-attentive to the child in a way that abrogates our responsibility to teach them, is another form of extreme Future2ism. It leads to the learnification of education about which, as we have seen in the previous sections, we need to be skeptical. Figure 1-2 offers a summary of why this is so.

Figure 1-2. Being skeptical of learning

Where 'learning' is regarded as:

• A good thing in itself – and assumed to be value free in this sense. [But learning can be trivial, undiscerning, dangerous, and wrong.]

• An essentially scientific or technical process – thus, with correct techniques, learning can be 'accelerated', as if this were a desirable end in itself. [But understanding ideas in science, art, or history can require sustained effort and perseverance and sometimes slow deliberation.]

• Paramount – teaching is subservient to, and led by, the learning. We become embarrassed by teaching, and rather talk about 'facilitating' learning. [We could say a profession that abrogates responsibility in this way has lost confidence in itself.]

In responding more fully to the agenda set out in Figure 1-1, and at the same time avoiding the Future 2 trap, we should, therefore, think more carefully about who are the children we teach. We need to start, naturally, by asking what role education can play in preparing children and young people for "this day and age",[6] whilst acknowledging, as we have seen, that this can easily lead to versions of Future2ism. So, we need to ask: how does *what* we teach make a distinctive contribution to the formation of the educated person? What do young people need to know and be able to do that enables them to face the future with confidence and as capable human beings?

The capabilities approach (Lambert, Solem, and Tani 2015) addresses these questions directly. Indeed the approach, which is manifest in the outcomes of the GeoCapabilities project[7], claims to be a means to enable Future 3 curriculum thinking partly because it asks us to justify what we set out to teach. In identifying intellectual preparedness as an aspect of human capability—for example, enabling young people to make choices about how to live, to sustain argument and independent thought and to become productive citizens (following Nussbaum and Sen 1993; Nussbaum 2013)—the project asserts the pedagogic right of all young people to acquire the knowledge and the means to think theoretically (in the abstract); to discern "better" knowledge and/or arguments; and to make good, supportable generalisations. What lifts this from the dangers of Future2ism is the insistence on inducting young people into specialized "powerful" knowledge. Interestingly, in the public discourse on education reform in

England, at least one opposition politician instinctively agrees with this position, even though the language is evidently not available to him to critique the conservative tendency to turn back to Future 1. Under the headline "Calling time on exam-factory education" he wrote,

> "… we always need to guard against the soft bigotry of low expectations: the worrying trend of play and expression being adequate for working-class pupils, while leaving the tough stuff, the physics and the history, for their better off peers." (Tristram Hunt MP Guardian 25.4.15)

A Future 3 curriculum is for all young people, independent of their circumstances. It is underpinned by powerful disciplinary knowledge, which, from a capability perspective, is the pedagogic right of all. It is to this we can now turn.

Powerful disciplinary knowledge (PDK)

We can use a fictitious, historical example to illustrate the place of powerful knowledge and why, as a matter of social equity, access to it matters. This is the case of Jeanne, described touchingly in Sebastian Faulks' 2012 novel, *A Possible Life.* Set in post-revolutionary France, she is introduced to us as "the most ignorant person in the Limousin village where she had lived most of her life" (Faulks 2013, 170). She is honest, warm hearted, and hard working, but nevertheless the butt of jokes and unkindnesses partly as a result of her lack of learning; born into poverty and an orphan, she had never been to school. Faulks depicts the resulting deficiencies by describing Jeanne's limited capacity to understand anything beyond her daily routine and encounters: "She made no judgement on what she had seen in her life, but each experience affected her idea of what the world was" (192). Jeanne could neither read nor write, but also, we learn that she

> "... lived her life from one minute to the next, with no plan for the future and no sense that she would one day grow old or weak ... Her time at the orphanage had given her a fierce sense of the supernatural ... She understood so little of the material world—how water boiled, why a walnut fell from a tree—that she had had to take almost everything on trust". (175–6)

In 21st century economically prosperous and technologically advanced societies where education is virtually universal and information about how the material world works is freely available to anyone with electricity and access to a computer, we might argue that the conditions of ignorance that condemned

Jeanne to such a closed existence—and to be prey to those who would exploit her over-dependence on the supernatural to explain her world—no longer exist.

However, the capable citizen is not simply a person armed with information and a marketable skill-set. After all, we could argue that even Jeanne possessed such basic attributes as these. What Faulks pointed to was Jeanne's lack of knowledge beyond her everyday life—that is, what Michael Young (2008) calls "powerful knowledge". This is knowledge that is derived from the disciplines. It is specialized knowledge and exists beyond the everyday experience of people. It is often abstract, being theoretical or conceptual, and it is enabling. In the 21st century, we argue that a crucial aspect of powerful knowledge is to enable young people to "think geographically". This includes acquiring "a sense of the global" without which their understanding of global inequalities, uneven development, climate change and much more is inadequate. Acquiring a "global sense of place" does not happen through everyday experience.

Figure 1-3. Powerful Disciplinary Knowledge [PDK]: some characteristics

PDK refers to the knowledge young people are unlikely to acquire at home or through their everyday encounters. It is usually:

- evidence based
- abstract and theoretical (conceptual)
- part of a system of thought
- dynamic, evolving, changing—but reliable
- testable, yet open to challenge
- sometimes counter-intuitive
- exists outside the direct experience of the teacher and the learner
- discipline based (in domains that are not arbitrary or transient)

Thus, geographical thinking using concepts such as space, place, scale, movement, and human-environment interaction allow students to analyse and form an opinion about real world problems. Using climate change as an example, students are encouraged to understand that climate change is a multifaceted issue which needs to be understood at different scales: this includes the global whilst at the same time holding in mind that global processes play out locally in very different ways. Geographical perspectives therefore encourage a deeper concept of interrelations, "enabling [students] to envisage alternatives" (Young and Lambert 2014, 74).

I have developed the hypothesis that powerful disciplinary knowledge in geography is what underpins and enables geographical thought more thoroughly elsewhere (Lambert 2016). To ask what powerful disciplinary knowledge "means" in school geography is a challenging question—equally so in other school subjects, for a list of contents alone does not tell us. The proposal I have made is as follows (from Lambert 2016, 404–5; adapted and developed from Lambert 2011a; 2011b; Solem, Lambert and Tani 2013).

> "Powerful knowledge in geography [consists]of:
> • the acquisition and development of *deep descriptive and explanatory 'world knowledge'*; this may include (for example) countries, capitals, rivers and mountains; also world wind patterns, distribution of population, and energy sources. The precise constituents and range of this substantive knowledge is de-lineated locally, influenced by national and regional cultural contexts.
>
> • the development of the *relational thinking* that underpins geographical thought; this includes place and space (e.g. the local and the global), the human and the physical, and notions of environmental interdependence and interaction. This knowledge component is arguably more independent of local circumstances and influences, being derived from the discipline—concepts like place, space, and environment are complex, evolving and contested and, referring back to an earlier metaphor, can be thought of as fundamental components of geography's syntax. They are sometimes referred to as geography's 'big ideas', 'key concepts', or 'second order' concepts.
>
> • a propensity to apply the analysis of alternative social, economic and environmental *futures* to particular place contexts; this draws on a range of skills developed through appropriate pedagogic approaches such as decision making exercises; in addition to intellectual skills such as analysis and evaluation, this also encourages speculation, imagination, and argument. If we accept that it is what students are then able to do (including, to think in new ways) that gives geographical knowledge its 'power', then this category, which we might think of as 'applied geography', is crucial.
>
> Understanding geography in this way is not straightforward and it is not easily derived from everyday experience and popular images of what is meant by the geographical. It requires specialist curriculum leadership, which is why we need specialist teachers who are engaged with geographic disciplinary thought and knowledge."

Readers of this chapter who come from different disciplinary specialisms will doubtless have other ways of responding to the question concerning the nature of powerful disciplinary knowledge. It would be very interesting to discuss this across the sciences, arts, and humanities and to build on existing formulations within the different traditions of curriculum and pedagogic thinking. I am aware that from my cultural/educational setting I formulate these concerns as predominantly to do with curriculum enactment, whereas elsewhere these are the concerns of specialist subject didactics. In both traditions, however, we can agree that leadership—what I refer to as "curriculum leadership" in the above passage—is important.

Teachers as curriculum leaders

I refer to leadership in a highly distributed sense. In other words, I do not refer to managers, executives, principals, or head teachers. If we aspire to a Future 3 curriculum, then all "teachers" have to accept the responsibility to "make it happen". This is one occasion, I think, when there really is no alternative. A textbook or a website cannot alone create such a "curriculum of engagement" (that is, engagement not in "learning activity" per se, but with specialist knowledge); nor can it be delivered by diktat by a policy maker, curriculum developer, or education guru, no matter how well meaning. Such a curriculum has to be made by teachers.

Figure 1-4. Towards a Future 3 curriculum

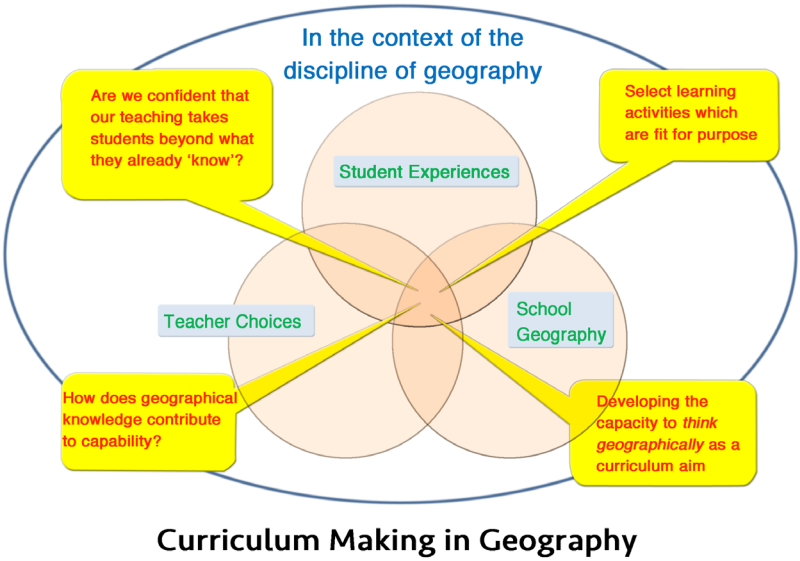
Future 3 curriculum thinking take on these characteristics. It is:

- a knowledge-led curriculum
  (not led by 'skills' or 'competence')
- based on 'powerful (disciplinary) knowledge'
  (and what Winch (2013) calls 'epistemic ascent')
- Progressive – motivated by social justice
  (ensuring the 'pedagogic rights' of all young people)
- Distinguishes curriculum from pedagogy
  (the why and what shall we teach, is distingusihed from the how)
- Pedagogic selections need to be fit for purpose
  (the how is dependent on what we are trying to teach, and why)

The summary provided in Figure 1-4 stresses that Future 3 thinking is based upon the notion of powerful disciplinary knowledge, access to which we can show, using the capabilities device, is a pedagogic right of all young people. But it is very hard to write down precisely what this powerful knowledge is. A

syllabus or examination specification must list contents, possibly organized under key ideas, but may remain as dry as dust, and inert, useless, and inaccessible to the student without the creative contribution of a teacher. This teacher has to grasp why her subject matters, which is to say wherein lies the powerful knowledge. With this specialist expertise she is in a position to make the curriculum "speak", as Figure 1-5 attempts to show. No-one else can do this.

Figure 1-5. Curriculum making in geography



There are some similarities and some differences between curriculum making as expressed in Figure 1-5, and the didactic triangle used in Central Europe and the Nordic countries. Both rely on the teacher to make professional decisions and judgments in order to balance the competing educational, general pedagogical, and subject focused priorities.

There is evidently some potential benefit to be made through the exploration of these models of specialist teachers' practice, for there is a crisis to address, as this chapter has attempted to show. In a review of Young and Muller's most recent book (2016), this crisis is described as follows:

> "Despite national curricular overloaded with content to be covered and learning goals to be met, knowledge continues to be confused with

> skills or information, derided by some as useful only for participation in pub quizzes. In schools overburdened with expectations, teaching subject knowledge becomes relativised as just one goal among many. The determination to make education 'relevant' means that promoting employability, emotional wellbeing and healthy lifestyles, or getting children talking about sex and relationships, happiness and resilience are often considered just as important as teaching a body of knowledge. In fact, when subject content is written off as being irrelevant, outdated or easily accessible, other goals come to be seen as more important to the purpose of schooling." (Williams 2016)

What I have tried to argue in this chapter is that collectively we may have forgotten that schools have a sacred duty to introduce children to the knowledge that they are unlikely to encounter at home or in their day to day lives. This is powerful knowledge. It is conceptual and part of a system of thought, reliable but always contestable and of great importance to encouraging independent, rigorous thought. Powerful disciplinary knowledge enables young people to think in new ways, or as Richard Peters said many years ago, "to travel with a different view" (Peters 1965).

In some subjects, such as geography, such powerful knowledge is quite difficult to pin down and we should resist to urge to do so. For it is not a set of facts or concepts that the teacher needs to "cover", but an understanding of the ways specialist knowledge comes to be and how it links together—how it "works". We need highly capable teachers to bring this to life, for such engagement with knowledge may be difficult and somewhat alien to many young people. But that is no reason not to try.

Notes

[1] I acknowledge the difficulty many readers may have in "translating" this idea within their own settings. Curriculum Making resembles the Nordic "didactic triangle," although it places the main emphasis on the teacher "enacting" the curriculum. It as become central in the GeoCapabilities project, which I lead (www.geocapabilities.org), and is placed in context in Lambert, Solem and Tani (2015).

[2] https://en.wikipedia.org/wiki/Gradgrind

[3] I have written about the "knowledge turn" in England which followed the installation of a Conservative led government in 2010 (Lambert 2011). Though well meant and broadly supported the danger is that without an alternative frame of reference the knowledge turn simply encourages a retrenchment of Future 1 thinking.

[4] https://www.ted.com/talks/ken_robinson_says_schools_kill_creativity?language=en Accessed 10 December 2015, when it had received over 36 million views.

[5] This version of the national curriculum was in fact shortlived. It was reformed by the incoming Conservative-Liberal coalition government of 2010, guided by their White Paper *The Importance of Teaching*, an overt statement challenging the "language of learning" (Biesta 2006) and the skills-based curriculum.

[6] Although Figure 1 spells out what we might mean by this phrase, an alternative approach, which speaks especially well to geography teachers whose object of study is the Earth as home to humankind, is to point up the significance of the Anthropocene, the current epoch of geological time during which human activity is measurably influencing physical systems (and will be traceable in sedimentary and fossil records).

[7] The GeoCapabilities project is supported by the European Union: Grant Agreement 539079–LLP-1–2013–1–UK-COMENIUS- CMP (2013–6). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the European Union Comenius Programme. Find more at http://www.aag.org/geocapabilities, http://www.geography.org.uk/projects/geocapabilities/ and www.geocapabilities.org

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Part I: Literacies

CHAPTER TWO

TOWARDS CRITICAL LITERACY: STUDENTS' READING SKILLS AND SOURCE EVALUATION

Elina Kouki and Arja Virta

Introduction

The enormous quantity of information, as well as disinformation, offered by a vast variety of internet sources today creates new demands for critical literacy (cf. Goldman et al. 2012). In this chapter, the concept of critical literacy is approached as the ability to see beyond the text and to look for factors behind the text that might be relevant for its comprehension and interpretation. Sometimes it is hard to distinguish between professional texts, opinion pieces, or even satirical writings. It can also be difficult to see the borderline between official and unofficial sources. Therefore, we must increasingly rely on our own judgement when dealing with information that is often biased, contradictory, or even false (Brumfit 2010, 15–16.) Actually, judgement is one of the core skills in what Jenkins et al. (2009, 79–82) call media literacy.

Critical literacy is among the fundamental cognitive competencies of an individual (Francke, Sundin and Limberg 2011; Rouet and Britt 2011; Smith and Lennon 2011) and can be seen as a social capital of a society and as a component of active citizenship (Dam and Volman 2004). As Apple (2000, 42–43) points out, there is a need for "critical literacy, powerful literacy, political literacy which enables the growth of genuine understanding and control of all the spheres of social life in which we participate".

The broad aim of the study presented in this chapter is to find out how capable students are as critical readers. In particular, we investigate how students at two different levels of education, basic and upper secondary, deal with a task that invokes the use of critical reading skills. However, our purpose was not to compare these two target groups, but to observe students' critical reading skills, using source evaluation as our major point of interest. We seek to identify these skills and discover how students make sense of multiple source documents. For this purpose, we provided the students a controversial historical topic involving multifaceted sources. In this research arrangement, we thus integrated the approaches of history and L1 (first language) with critical reading as an educational objective and as the key competence of the 21st century (Jenkins et al. 2009).

Critical reading skills: Making sense of multiple source documents

A common trend in recent curriculum development is the question of teaching critical reading skills (Jenkins et al. 2009; Jonassen and Kim 2010; Rapanta, Garcia-Mila and Gilabert 2013). The concept of critical reading skills subsumes several sub-skills, such as seeing the difference between verifiable facts and opinions or value claims, recognizing logical inconsistencies or fallacies in reasoning, detecting biases in information, as well as assessing the strength of argumentation and the relevance and quality of sources (Macedo-Rouet et al. 2014, 204–226). Indeed, it is important that students learn to assess the quality and relevance of information, especially because of the digital turn (Britt and Rouet 2012; Leino 2014; Leu, Kiili and Forzani 2014; Macedo-Rouet et al. 2014, 204, 205).

The ability to evaluate the credibility and reliability of multiple texts and documents is an essential aspect in learning situations in which the students have to use information from multiple texts (see also Literat 2014; Martin and Rose 2012). This requires a deep comprehension of texts which promotes critical reading skills. Possessing such skills is raised as the main aim of both L1 and history studies in Finland, according to the aims and assessment criteria of the *National Core Curriculum for Basic Education* in 2004, and is further elaborated in the latest curriculum (2014). Similar aims are included in the *National Core Curriculum for Upper Secondary School* (2003; 2015). Additionally, history curricula in particular tend to emphasize skills-based approaches and teaching methodologies that train students in adequate use of historical evidence (e.g. Monte-Sano and De La Paz 2012; Reisman 2012; Veijola and Mikkonen 2015).

Reading processes can have specific features subject to the content area; when history is concerned, language is significant because historical knowledge is largely constructed on the basis of written sources and mainly also communicated verbally. Yet, reading history is more than just decoding the manifest contents of the text as the reader has to go beyond the text and situate the messages into their contexts. In order to become critical readers, students therefore need to be trained to choose, contextualize, analyze, interpret, evaluate, and exploit the sources and their purposes (Britt and Rouet 2012; Francke et al. 2011; Smith and Lennon 2011, 46). Moreover, multifaceted and mutually contradictory sources are useful for understanding the differences between valid arguments and discrepant opinions (Macedo-Rouet et al. 2014, 205; Rantala and van den Berg 2013, 394–407).

Wineburg (1991, 495–519) has aptly divided the process of working with historical evidence into sourcing (evaluating the source of the document), corroboration (checking the factual information against other documents), and contextualizing the message within a broader background. The process of reading as a historian also requires analyzing the language of history: ideologies, metaphors, analogies, emotions, as well as devices of rhetoric implemented towards the influencing of the reader (Stradling 2001, 101–102; Husbands 2003, 30–42). Another requirement is to learn to understand and compare various interpretations and to accept the fact that there are perhaps no simple truths but instead various approaches to the same event (Wineburg, Martin and Monte-Sano 2011).

According to Francke et al. (2011, 681–688), there are different kinds of relevant frameworks for evaluating the credibility of sources. These include rhetoric in general, genre, and authorship, as well as author's perspective and social commitment, all of which are regarded as important factors in source evaluation. Moreover, references, applicability of the sources, and the currency of the text help to assess its reliability (Brumfit 2010).

However, it is unclear how these competencies are achieved at schools. In the 2011 national evaluation of the outcomes of history and social studies in Finland, more than half of the participants reached at least a moderate or satisfactory level (Ouakrim-Soivio and Kuusela 2012). Other studies give evidence of upper secondary level students' difficulties in critical reading of sources. In studying such students' skills of interpreting historical sources, Rantala and van den Berg (2014) implemented Van Sledright and Afflerbach's (2005) categories of types of readers, i.e. novices, recognizing, differentiating, understanding, and evaluating types, and found that most of the Finnish respondents fell into the category of novices. Notwithstanding this, there are studies suggesting that students do understand the process of constructing historical knowledge on the basis of sources when they are scaffolded and shown how to compare and contrast conflicting sources (Lee and Ashby 2000).

The primary purpose of the presented study was to find out how capable students are as critical readers. This question was addressed by observing the students' performance in source evaluation. Our further purpose in the study was to focus on two different age groups or levels of education. More specifically, we undertook to find out how a group of students in basic education, and a group of upper secondary level students, discuss a multifaceted historic topic on the basis of the source material provided to them.

A key question in both cases was how the students understood the multiplicity of the authors' perspectives. In particular, the first part of the study, with the younger target group, was concerned with the students' skills in seeing the differences in the sources, e.g. message, genre, and authorship as well as in their skills in assessing the credibility of sources. The second part of the study dealt with upper secondary students' comments on their writing based on a complex set of documents, a process in which they needed to implement various skills of critical reading.

Materials, participants, and methods

In our view, the integration of L1 and history studies is essential because literacy skills and critical thinking are crucial for both subjects. Therefore, the task assigned to students was based on a set of evidence typical for learning tasks in L1 and history education. The subject matter of the source material provided for students in the research arrangement deserves some illustration at this point. It namely deals with a national issue, debated from the years of the Second World War: the evacuation of so-called *war children,* from Finland to other Nordic countries.

On the basis of a Swedish initiative and an official decision made by the Finnish Social Ministry, about 80 000 children were transported from Finland, mainly to Sweden. It was the families that decided whether to send their child or not. After the war, Finnish families wanted to have their evacuated children back home while many Swedish foster parents wanted to keep them. Ultimately, some of the war children stayed in Sweden and were in due course adopted by their foster families. This remains controversial. Undoubtedly, the circumstances in Finland were difficult, and the future of the whole nation was uncertain. Of course, the evacuations were emotionally hard for children, who had to leave their families, homeland, and mother tongue. Granted, many of them have spoken about positive experiences as well. This basically affective human issue may not be personally touching for today's teenagers, and indeed it has not been given much attention within the big story of the Second World War. Textbooks tend to merely mention the topic, briefly, possibly with an authentic photograph of war children (Virta 2009).

In this study, the selected sources made available to students portrayed opposing opinions and attitudes, as well as different kinds of textual genres, indicating the controversy surrounding the question of war children. In addition, we offered the students some lines of background information and a few

photographs of war children. The following source materials were employed to represent different genres:

- Sources 1 and 2: Memoirs of war children
- Source 3: A letter from a mother to a foster family
- Source 4: An excerpt from a newspaper article
- Source 5: An excerpt from a social media discussion
- Source 6: A summary of a PhD thesis (not included for 8th graders)

Sources 1 and 2 consisted of intimate personal memoirs and descriptions of the war children's positive as well as negative experiences during the transportation and stay in Sweden. Source 3 was an authentic letter from a Finnish mother to her son in Sweden during the war, which reveals the parents' anxiety together with the difficult and dangerous circumstances in Finland during the war. An emotional citation from a war-time newspaper against child transportations was offered as Source 4. In turn, Source 5 was a short excerpt from a recent social media discussion, similarly against the evacuation, and Source 6, a scientific summary of a PhD thesis, mainly dealt with negative consequences of evacuations as well. The study incorporated two target groups or substudies defined on the basis of the subjects' age levels as explained below. We used similar source material with two exceptions. Source 6 was not given to the younger group to read, instead we used photographs as starting points for interviews.

The participants in the younger group were 8th graders (n = 24, age 14 years, 9 females, 15 males) from two classes in a comprehensive school, whereas the participants in the other group (n = 96) came from five classes in an upper secondary school in southwest Finland. The data was collected from the 8th graders by a structured interview, and from the upper secondary students in the form of an essay during L1 and literature lessons.

Because both schools often participate in research, thanks to their roles as university teacher training schools, and students therefore frequently serve as subjects or respondents, their parents have authorized the students to participate in academic research during their school years. The reason for using two different methods for collecting data was mainly related to the students' ages. Our assumption was that the younger group would produce richer answers orally than in writing, given the fact that a large part of the students had Finnish as their second or third language. We also wanted to experiment with two different

methods of approaching students' reasoning on the basis of documents and the purpose was not to compare but to complement.

The 8th graders were interviewed individually, during their history lessons, in separate rooms. We had designed an interview guide, based on a carefully structured presentation of the sources. The students were first asked to read the background information and to offer their thoughts about the photographs of war children. After that, they were asked to read the first four textual sources and to answer factual questions, such as the reasons for evacuations. This was done in order to check that they had understood the contents. Step by step, they were conducted to go deeper into the issue by giving them multifaceted short source texts about war children to read. They were asked if they saw differences between the sources, and how they felt about the credibility of the sources. After reading the whole set of evidence, they were asked to consider the transportations of children, on the basis of the sources, from the children's perspective. Finally, they were asked to discuss why the evacuation of war children is still a controversial topic today.

The duration of the interviews varied from 12 to 20 minutes. The interviews were recorded and transcribed verbatim. For the analysis, the interviews were organized so that the answers of all participants were grouped for each question, in order to compare the styles of the students' thinking and argumentation. In this chapter, we focus on their skills of dealing with source material critically and comprehensively.

The upper secondary students were 16–19 years old. The number of participants was 96 (58 females, 38 males). Five of them had Finnish as a second language (L2). The data here is treated anonymously by marking the essays with codes (G1:1, G1:2, G1:3; G2:1, G2:2, G2:3; G3:1, G3:2, etc.). The letter G and the number after it refer to one of the five classes, and the last number of each code to each student in that group. For example, code G3:8 refers to student number 8 in class 3.

The upper secondary students were given 75 minutes to read the provided source materials and write an essay about the topic. The writing task given for the students was as follows:

> Consider the decision of the Finnish Government to send children to Sweden as 'war children'. Pay attention to different perspectives (the children's, their biological parents', and the Swedish foster parents')

> using the documents attached, according to your choice. From what point of view was it a good decision, and what problems did it possibly cause? Make your conclusions on the basis of the source materials. Formulate the title for your essay (for instance 'Finnish children sent to Sweden from the middle of the warandhelp and its consequences').

The data was evaluated to find out students' critical reading competence. The analysis of the interviews first focused on one aspect of critical literacy: how the participants understood the differences in the sources, and their messages and perspectives. The second target was how they explained the credibility of sources, and which sources they preferred. This analysis draws on the contents of the students' speech, and all relevant units were gathered and categorized according to their contents. The essays (approximately 250 pages of handwritten texts) were investigated by content analysis in order to find out how the students used the sources provided, and how they discussed this controversial issue by drawing on texts that conveyed multiple viewpoints.

Both authors independently examined the essays in light of the research questions. After systematic investigation of the students' essays, the findings were compared and evaluated for verifying the reliability of the analysis. The highlights of the findings were selected for further classification and for the design of the tables that describe and summarize the various aspects of the data. Frequencies were counted to better illustrate the structure of the data. In reporting the findings, quotes from the students' interviews and essays in Finnish were translated to English by the authors of this chapter. Methodologically, this study mainly employs a qualitative content analysis, but descriptive statistics are also included in making conclusions about upper secondary students' skills of critical reading, especially source evaluation.

Results

8th graders' reasoning with multiple sources. The first step in assessing the students' skills of dealing with documents was to check how they understood the primary factual contents of each document. In general, all of the 8th graders were able to understand the controversial nature of the assigned topic on the basis of the selected sources. All interviewees felt that the photographs were sad or depressing, but they mainly described what they saw in the photographs without comparing them. The respondents understood the main factual contents of the written sources and could mention different reasons for sending children to Sweden. They could tell that it was because of the children's safety and the wartime circumstances, such as bombings and the lack of food. They also managed to find the different perspectives contained in the sources and, sometimes when specifically asked, saw that the authors represented different types of persons (mother, war children as adults, journalist). In addition, they could point out which sources supported the child evacuations and which opposed them.

However, it was obviously difficult for the students to explain why the sources were reliable or not (Table 2-1). The explanations are first classified into broad categories, under which we identify more specific types. Each single reference to reliability is categorized. Some interviewees gave several types of explanations, all of which have been included. A majority of the 8th graders considered the primary sources reliable, especially personal memoirs and letters, because "the person is telling him-/herself or about his/her own experiences." Some students supported their opinions with previous knowledge: "I have read that in history books." Quite frequently, the respondents needed introductory questions to be able to reflect on reliability or credibility.

Table 2-1. Types of explanations for why students considered sources reliable or unreliable

Reasons for Reliability	Reasons for unreliability
TYPE: Explanation based on primary sources	**TYPE: Relativity of the question**
The child / the person is telling himself/ herself	That is not the whole truth; some may have had it that way; most of them were feeling well
When it is about the person's own experience	
Letters are reliable	
Photos are reliable	
TYPE: Explanation based on secondary sources / previous knowledge	**TYPE: Opinions are not reliable**
Student has previous knowledge (has heard or read about it in history books)	Suspicions about factual contents
TYPE: Quality of evidence	**TYPE: Quality of evidence**
There are many sources and points of view	Writing under a pseudonym (newspaper column)
	Internet sources are unreliable (cf. above: letters are reliable)
TYPE: Miscellaneous; student not explaining but giving individual impressions	**TYPE: Miscellaneous**
Thinks/feels that sources are reliable and cannot tell why	No specification; the respondent cannot tell why s/he feels that the sources are not reliable

The following quote provides an example in which the student is able to distinguish between different types of sources and obviously also understands the complexity of the question as well as differences in individual experiences. The student is underlining the firsthand experience of the phenomenon and is suspicious of a piece of writing on the internet, though they do not reflect further on the contents but rather makes the conclusions on the basis of the authors' position.

> Interviewer: Do you think the sources give a reliable view of the event? Do you doubt something?
>
> Student 11: I do not believe that the whole truth can be told in these sources because all of them aren't reliable. Some children were not feeling so well in Sweden but most of them were.
>
> Interviewer: Which one is reliable, which perhaps not?
>
> Student 11: For example, this pen name "Thinker" can have written in the chat forum about somebody else's experiences, but that cannot be trustworthy. It is just written on the net.
>
> Interviewer: What about letters then?
>
> Student 11: They can be fairly reliable, when a war child has in olden days told about his/her experience that can be true.

There were few suspicions about the factual contents of the texts. It is noteworthy that internet sources as well as the newspaper text written under a pseudonym were seen as less convincing than for example the letters, although all this was subjective material. Many of the students had noticed that the texts were contradictory, as is shown in the excerpt that was quoted above. The 8th graders showed a distinct progress in understanding the different perspectives after they were scaffolded with the guiding questions during the interviews. Yet, there were also comments that reveal the complexity of the topic. It was hard for the students to explain why a source may not be reliable, and they seemed to rely heavily on their own impressions (see Brumfit 2010, 15).

Upper secondary students as source evaluators. Only 9.4% of the upper secondary students incorporated evaluation of the sources into their essays and referred to them as an organic part of their argumentation. Most of them did not assess the credibility of the sources, and as many as 32.3% did not mention the sources at all. Furthermore, if more than one source was mentioned, it was only "knowledge telling" (Scardamalia and Bereiter 1986), not critical reading. To sum up, most students were not used to assessing the reliability or the credibility of the sources (Table 2-2).

Table 2-2. Upper secondary students' (n = 96) ability to use source materials and make references, numbers (n = 96) and percentages

How Students Referred to Sources	Number of Students (%)
No references made	31 (32.3%)
References only to "texts" or "materials"; not specified	12 (12.5 %)
One source mentioned by name	17 (17.7%)
More than one source mentioned but only telling previous knowledge	27 (28.1 %)
Convincing and critical use of sources; proper references	9 (9.4 %)

Table 2-3. Students' use of different sources (1–6), numbers (n = 96) and percentages

SOURCES →→→→	**NUMBER OF ESSAYS with a reference to the source (%)**
SOURCE 1: Memoirs of war children	43 (44.8%)
SOURCE 2: Memoirs of war children	38 (39.6%)
SOURCE 3: Letter from a mother	18 (18.8%)
SOURCE 4: Excerpt from a newspaper article	18 (18.8%)
SOURCE 5: Excerpt from social media discussion	7 (7.3%)
SOURCE 6: Summary of a PhD thesis	25 (26%)

Table 2-3 shows that most often the students referred to the memoirs of war children (Sources 1 and 2). Correspondingly, most of the students who used the letter of a mother (Source 3) as evidence, considered the evacuations a wrong decision, even though the letter included specific descriptions about the dangers and horrors of the war. The letter also articulated an important human factor: the mother missed her son. Source 4, a citation from a war-time newspaper, was against evacuations, but three respondents who used this source still considered transportations a good decision. Regarding Source 5: the students seemed to be least inspired by the excerpt from a social media discussion which strongly criticized the transportations of war children; only 7.3% used it as a reference. Correspondingly, none of the students who considered the evacuation a right decision referred to Source 5. Moreover, only 26% referred to Source 6 (a summary of an academic dissertation), which focused strongly on the negative effects of the evacuations, and merely 8% of those who read the scientific abstract considered the evacuations a right decision.

It is obvious that the students preferred the affective and subjective sources, rejecting the formal ones. Instead of analyzing the sources, they often criticized the phenomenon as such and described it emotionally: "Migrating alone to a

foreign country was certainly a highly stressful and traumatizing experience for many of them" (G1:8). The lack of facts and historical knowledge left the students to argue on the basis of their own experiences, thoughts, and feelings: "Children's thoughts are simple. What they need is safety and love. When these are given by whosoever, children consider those people their parents, regardless of whether they are biological or not" (G2:22). The students were apparently confused by the issue, and it caused anxiety among them. Their strong will to somehow understand the reasons for the evacuations may also be seen in their comparisons between the wartime and the present. For example, two of the respondents mentioned the experiences of exchange students as similar to what war children had faced (G1:2; G2:13), and one of the students suggested that evacuation offered a good possibility to see a different kind of life (G4:2). Also, an analogy between the situation of war children and present-day child custody was suggested (G2:13).

Discussion

The source material used in this study represented different genres and included contradictory information about the question of war children. In general, the students' comments tended to be occasional observations rather than the results of consistent and critical analysis. A remarkably large number of the students neither mentioned the sources nor made any references to them. They did not assess, criticize, or evaluate the credibility or reliability of the source material. The most popular means to discuss the subject was the traditional in-my-opinion style, in line with what, for example, Jonassen and Kim (2010, 442) have found in their studies. When the students did make use of the sources, they typically just picked up the facts (see Francke et al. 2011, 678).

Only a few upper secondary students evaluated the sources in their essays. Instead, it was common not to take into account or analyze the genre of the source text, the writer, the date, the aims of the text, or the forum of publication. This suggests that the students are not accustomed to source evaluation and the basic demands of critical reading, or that they do not do it spontaneously. The same can be said about the younger group of respondents, although the 8th graders did, sometimes, after introductory questions, discuss the quality of sources and explain why a certain source could or could not be trustworthy. Their reasons were short and superficial, obviously owing to a lack of contextual knowledge; Indeed, as Scardamalia and Bereiter (1986) claim, "knowledge telling", i.e. repeating the contents of documents and other sources, is not critical reading.

Furthermore, rather than analyzing the sources, the upper secondary students often emotionally described the phenomenon as such. This, too, can be explained by the nature of the sources, some of which were intimate memories. Such an emotional stance was not obvious in the younger group, because interviews were structured and focused on reliability and factual contents.

Moreover, some upper secondary level students made arguments for or against the evacuations of children by using the sources selectively, even though they were only instructed to discuss the positive and negative effects of child transportations and not to make justifications. They did not evaluate the source texts or use them as reference material, but did understand the multiple perspectives of those who were involved. These findings suggest that controversial, emotional, and ethical questions can offer opportunities to teach critical reading skills by raising students' awareness of the importance of source evaluation and valid argumentation.

Finally, regarding the limitations of this study, let us point out that our conclusions are based on a small data set, and further experiments need to be conducted before any generalizations can be made. For instance, it is possible that our informants could not verbalize their thoughts perfectly. Nevertheless, this study offers certain feasible ideas for eliciting students' skills in critical literacy, such as asking critical questions, and using relevant sources that touch them.

Implications for policy and teaching

Even if the aims and contents to teach critical literacy are expressed in national curricula, there is a need for more specific information about how to construct the teaching of critical reading skills in a proper way. Teachers need new didactical tools and professional couching to engage learners in the use of their critical reading skills, because a citizen's ability to function in society is an important part of critical competence (Apple 2000; Dam and Volman 2004).

According to previous research (Wiley and Voss 1999; Monte-Sano and De La Paz 2012), writing an argumentative essay on a historical topic has proved to be a successful method for learning conceptual understanding, compared for example to writing summaries, narratives, or explanatory essays. Furthermore, discussions and debates are generally seen as "a welcome departure from the lecture and memorization" because they offer students "a unique opportunity to stretch themselves beyond the familiarity of their contemporary belief system", as Reisman and Wineburg argue (2012, 185), and, as pointed out before (Reisman

and Wineburg 2012), student engagement is an important aspect of motivation and substantive learning.

Furthermore, the importance of teaching critical reading skills at schools is to be especially underlined in light of the "digital turn"; after all, the demands and possibilities of the 21st century and digital learning environments are totally different now compared to the previous eras (Kuhn and Crowell 2011, 5). Thus, the learning of literacy calls for new didactics and pedagogical methods to help students in confronting new digital environments. The skills of using digital sources and assessing their relevance, sufficiency, and credibility are necessary because students are now able to access more sources and second-hand knowledge than ever before, thanks to the modern web and mobile technology (Francke et al. 2011, 676–77, 691; Macedo-Rouet et al. 2014, 207, 222; Wineburg and Reisman 2015). When students learn to understand the importance of adequate sources and convincing arguments, they learn skills needed in everyday life. Curriculum designers and other educational decision-makers need all possible support in constructing fresh guidelines for future curricula that focus on learning critical reading skills.

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CHAPTER THREE

WHY PHYSICAL GEOGRAPHY? JUSTIFICATIONS IN TEACHER MAGAZINES IN GERMANY

Anke Uhlenwinkel and Péter Bagoly-Simó

Aims

In the 1970s and 1980s, following developments of the academic discipline, school geography in (West-)Germany emphasized the social science dimension of the subject. While some efforts were made to return to regional geography, a change in policies could only be achieved after the reunification, when East German approaches were welcomed as supporting traditional school geography. Thus, we saw, in the mid-1990s, efforts by the earth sciences to use geography lessons as a means to promote their natural science (Alfred-Wegener-Stiftung and DGfG 1996). These efforts openly contradicted school curricula in all federal states, but they may have led some teachers, parents, and students to think that geography could be categorized as a natural science. For instance, a student who had failed his natural science courses went to court in an effort to force his school to accept his better grades from geography instead—though he ultimately lost, the Administrative Court ruling that geography in upper secondary school was a social science (VG Trier).

In light of this conflict, the aim of this paper is to trace the changes that have taken place in the justifications of physical geography as a part of school geography in Germany over the last few decades. To investigate these shifts, we will look at German publications for school geography, with a focus on whether there has been a shift in justifications offered by authors of teaching material in Germany.

Introduction

The justifications of physical geography as part of the school subject are dependent on several aspects, such as the academic debates within the respective countries or language communities or the different contexts in which geography education is situated. In Germany, as well as in several other countries around the world, these educational contexts have to be defined on a regional rather than on a national level. Thus, in Germany, the framework for geography at schools is determined by the federal states (Uhlenwinkel 2013). Meanwhile, in Britain,

what is termed 'national curriculum' is valid for the nation of England only (Department for Education 2014). Similarly, the Romanian (MEC 2009) and Mexican curriculum (SEP 2011) bear national validity. Comparing geography education in these two contexts, one difference that can be discerned is the school years in which geography is taught: In England and Mexico there is a strong primary geography, while in the German federal states geography is usually taught as part of an integrated subject in primary school. Depending on the state you are in, this subject may encompass a number of different subjects (history, civics, geography, biology, physics, chemistry). Looking at the other end of the school years: geography in England and Mexico is absent from the national curriculum at K 4 (14–16 year olds) while in Germany, at least in those schools leading to the entitlement to study at university, it is usually obligatory at K 3 and 4 and optional at the post-16 level. It is at the post-16 level, that geography in Germany is definitely classified as a social science.

This classification is due to the coincidence of a far-reaching educational reform in the early 1970s and a change of paradigm in German academic geography that has repeatedly been described as the 'scientific revolution' of Kiel 1969 (Fachschaften 1969). The core of this revolution was a shift from regional geography to thematic geography. Similar changes took place in other countries, where they were usually seen as a more gradual development from a conceptual focus on place to a conceptual focus on space. In German school geography, this change was accompanied by an ongoing debate on the role of physical geography within the new framework of spatial sciences. Thus, already one year before the Kiel revolution, Hoffmann (1968) published an article in which he promotes the teaching of physical geography with the explicit aim of saving the traditional approach of regional geography. To achieve this, he defines the subject by the object it studies, namely the landscape, and introduces some experimental methodologies adopted from the natural sciences. He was also ready to give up the strict environmental determinism related to most of German landscape science in school and to replace it by an environmental moralism.

In the years following the 1969 revolution, the debate on the role of physical geography in the classroom had largely subsided, but it was revived in the early 1980s when two competing views emerged, one voiced by a geography educationist (Härle), the other by a physical geographer and academic scientist (Jannsen). Härle (1980) proclaimed a 'geo-ecological deficit' in school geography which he mainly understood as a lack of moral education promoting 'green' values. His position can be classified as anti-rational, but also as anti-political. Contrary to this, Jannsen (1982) claimed that physical geography in the classroom could only be saved by civic education. He argued for a rational, scientific

physical geography that answered to politically relevant questions and fostered critical thinking. Although this perfectly fitted the societal development, it was vehemently resisted by mainstream geography (Uhlenwinkel 2006).

Not surprisingly, Härle's position prevailed, at least until Hartwig Haubrich undertook the effort to merge the growing call for more earth sciences in geography with Gaia meditation (Haubrich 1994). His likewise rather anti-rational and anti-political approach was criticized from two perspectives: an epistemological discussion of the understanding of the term nature and its links to traditional geography (Schultz 1996; 1997; 1999) and a scientific challenge of the short-comings of methodologies and explanations from the natural sciences in physical geography (Lethmate 2000a; 2000b; 2001). While the epistemological critique went almost unnoticed, a lively debate ensued around the question of the scientific merits of physical geography. Lethmate did not explicitly share Jannsen's contested position, though he did share the accepted classical understanding of geography being defined through the objects it studies. Despite this, his emphasis on rational thinking and non-moralistic teaching made him a target for the defendants of the classical approach (Kross 2000; Haubrich 2001). At this stage, it became obvious that the debate was not so much about the relation between physical geography and civic education, but about the rational reasoning that was part of both political education and the natural sciences (Uhlenwinkel 2005).

Although there were efforts to introduce individual learning strategies, German school geography remained, until this time, strongly based in a Future 1 framework (Young and Muller 2010), emphasizing factual knowledge. This only changed with the promotion of competence oriented curricula after the so-called PISA-shock, when something closer to a Future 2 'learning to learn' framework made it into mainstream geography education. In this context physical geography was no longer defined through the objects studied, but through the pedagogy it offered, namely the chance to use experiments, which were mainly viewed in the light of student activity (Wilhelmi 2014). This approach is thus rational, but neither abstract nor theoretical.

In Britain, the recent debate about physical geography has unfolded along different lines. As in many Southern European countries (e.g. France and Portugal), the British educational discussion differentiates between physical geography content being embedded in a social issues context—that would be similar to the German civic education approach (Rawding 2013)—and a 'deep' earth science that is linked to a natural science subject (Hawley 2013). This difference is mirrored in the English-speaking academic debate. In 2012, geologist Stephen

Johnston made a proposal that was similar in intention to the efforts by German geo-scientists to introduce their discipline into school geography, claiming that "earth scientists need to be strong contributors to debates and discussions concerning the magnitude and consequences of climate change" (Johnston 2012, 6). To achieve this, according to Johnston, one had to "get rid of geography departments" as this would help "physical geographers to be important members of comprehensive earth science departments" (2012, 7). Contrary to the same claim in the German community, Johnston's ideas have been contested by physical geographers. Lave et al. (2013), for instance, argued for a need for a critical physical geography that should collaborate with critical human geography. Only slightly later, Tadaki et al. (2014) partly contradicted this view, maintaining that an integrated approach was too monolithic and that there was a need for critical reflective thinking in all fields of physical geography. This would open up enough space for free decision-making that is significant for democratic societies (e.g. Möllers 2009).

Even before this debate ensued there were numerous attempts to bring physical geography back into the main debates of English-speaking geography. The book Key Concepts in Geography (Clifford et al. 2009) explicitly discusses the contribution of geographical concepts to understanding within both human and physical geography. This is noteworthy as the chapters on physical geography clearly show that there has been alienation between its endeavours and the conceptual thinking in geography—hence the reader is told that the concept of space has been 'neglected' (Kent 2009, 97), and that the concept of place was treated merely 'implicitly' (Gregory 2009, 173). Only recently, it seems, there has been a renewed tendency to re-unite with the former mother-subject. *A World After Climate Change and Culture-Shift* chose a completely different approach to solve the same problem. Here the main idea is not that the two spheres can easily be integrated into one view but that there are "two trends moving in opposite philosophical directions" (Norwine 2014, 2), with "climate change constricting the limits of possible behaviours and postmodern culture expanding then to infinity" (Norwine 2014, 2).

There is thus a theoretical debate in the English-speaking world that revolves around the role of physical geography in general and also specifically around the approach taken within the sub-discipline. This latter discourse sees physical geography move away from more positivist approaches that focus on everything measurable to more constructivist approaches that focus on human understanding and critical thinking (Hawley 2013).

Considering the theoretical debate outlined here, it would be reasonable to assume that the justifications offered regarding teaching materials should mainly spring from values education in Germany and that these justifications should differ from justifications proposed in Britain. To test this assumption, we conducted a survey of the justifications offered for teaching materials on weather and on volcanos.

Method and sample

Our survey is based on a systematic content analysis (Mayring 2010) of teaching materials from two leading German geography teachers' journal ("Praxis Geographie" and "geographie heute") published between 1979 and 2014. Both journals publish teaching material that can be used for the purposes of lesson planning. Each article offers a brief introduction containing the justification of topic and/or skill area choice along with recommendations of the pedagogical nature. Materials, of varying number, that can be easily printed or copied, follow the introductory words. To achieve the widest possible distribution across the federal states, both journals publish papers that are compatible with most state curricula (i.e. curricular links are rather general) and can be used at different stages of education (e.g. primary, lower, or upper secondary) based on the specific setting of each school.

A systematic content analysis encompasses three steps to extract valid data from a text: first the relevant content is paraphrased, then it is generalised for each separate artefact, and finally the content of all articles is categorised so that—as in our case—periods of different emphases in justification can be identified (cf. Mayring 2010). Individual articles contained varying numbers of artefacts, which were coded and considered in their entirety.

The topics of weather and volcanoes have been chosen to test whether there are any differences in the justification between what, at least in Germany, would be seen as a classical geographical topic and a classical geological topic (Hard 1982).

Three indicators served to analyse the types of justification. While the first indicator (number of papers per year) offers general information, the second (justification of topic choice) and third indicators (educational objectives) reveal patterns of justification. The justification of topic choice refers to arguments developed by authors to explain why they developed teaching material for the topic

volcanoes and weather. In contrast, the third indicator measures the objectives connected to teaching volcanoes and weather.

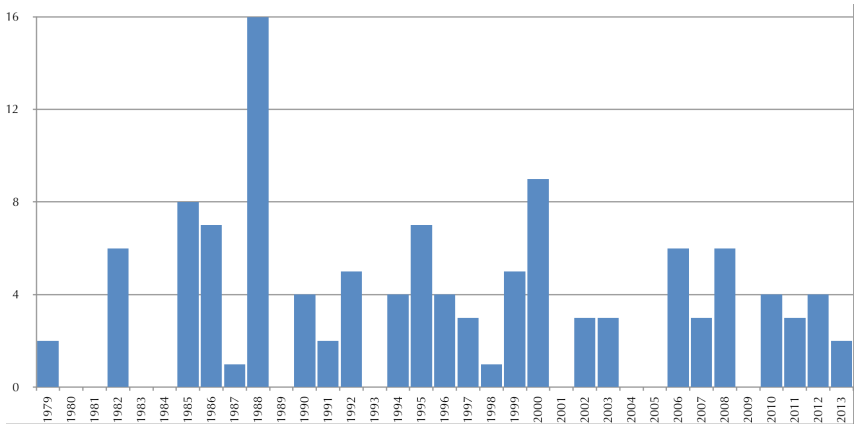
Results

Between 1979 and 2013, a total of 172 articles published in the journals "geographie heute" and "Praxis Geographie" discussed the topics of volcanoes and weather. Weather enjoyed slightly less attention as compared to the topic of volcanoes.

Volcanoes

From 1979 to 2013, a total of 118 papers discussed volcanoes in the two German teacher magazines.

Figure 3-1. Number of papers/year dedicated to "volcanoes"

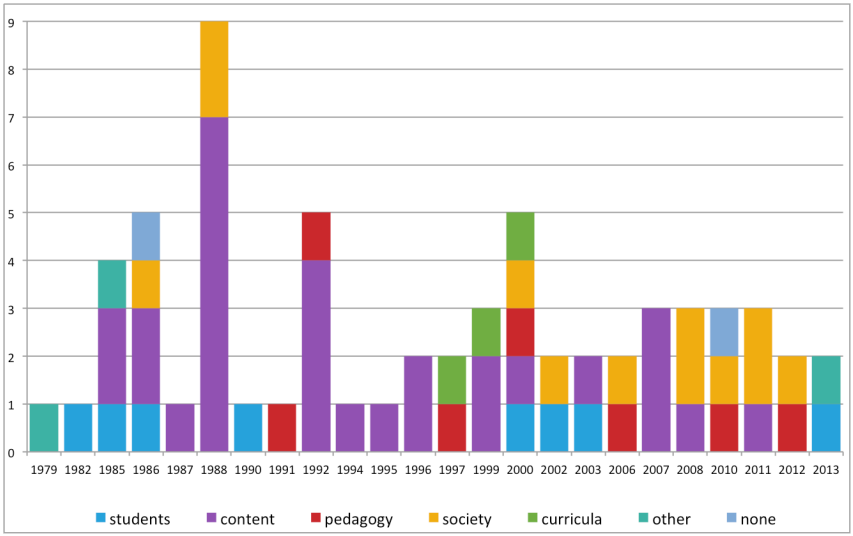


The first indicator shows an average of 3.37 and a mean value of 3 papers per year (Figure 3-1). The overall trend over the last three decades is a slow and steady decline in numbers. Nonetheless there is a marked distribution pattern, where papers dealing with volcanoes were published more evenly between the years during the 1990s, while the 1980s and 2000s show a focus on few(er) years. The even distribution in the 1990s may be related to the reunification which led to an integration of the East German tradition, with its strong emphasis on physical geography, and to the efforts, undertaken in the early 1990s, of the

geography teachers' associations to join forces with the earth sciences. If this relation is valid, then the development of the 2000s might be seen as a return of the subject to its own roots.

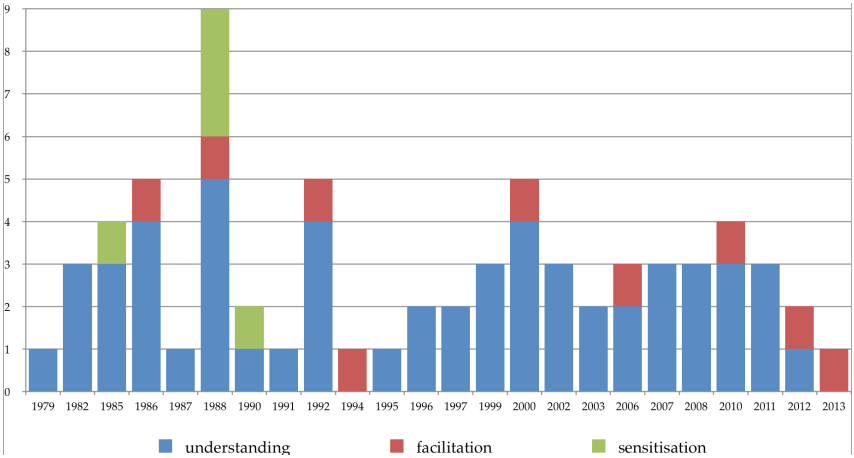
When justifying their choice of topic, authors use five main reasons. The overwhelming majority stresses the importance of content, followed by societal demands. The needs of students and pedagogy appear as additional justifications—though their counts are significantly lower. Justifications related to curricula are rather marginal. Looking at the dynamics of justifications over the decades, content remains central from the late 1970s until the end of the 2000s. But its position is challenged by justifications based on societal demands that become just as relevant in the 2000s. Of the two less-often named justifications, pedagogy shows a relative stability since the beginning of 1990s, while the importance attributed to the needs of the students oscillates over the decades. Overall, there is a development away from the predominance of justifications based on content, with justifications based on the pedagogical process and on societal goals becoming more important from the 1990s and 2000s respectively. Interpreting these shifts in the light of the findings on the development of the number of publications poses a certain challenge as the time when the topic of volcanoes is strongly promoted coincides with the time when pedagogical justifications become more important. This seeming contradiction can be solved by considering that school geography is not only influenced through discipline policies but also by the educational debates of the time. Thus, in the 1990s a larger part of the justifications can be attributed to the promotion of learning-to-learn approaches in education more broadly. Meanwhile, the emphasis on societal goals in the 2000s may mirror a change in the way that physical geography was integrated into school geography. While in the 1990s there was a strong surge to integrate the content knowledge of the earth sciences, in the 2000s human-environment-relations became more important, with physical geography being perceived as a part of geography and not as an alien discipline that is more closely linked to geology.

Figure 3-2. Justifications of topic choice: volcanoes



The analysis of the artefacts revealed three types of justifications regarding the educational objectives (Figure 3-3). Most papers stress the importance of understanding. Some papers justify the topic of volcanoes not only by the facilitation of understanding but also by sensitisation—as a form of awareness-raising—for the topic. However, facilitation plays only a marginal role and sensitisation was not found in papers published after 2000. The strong focus on understanding stresses the continuity of content within the concurrent changes of subject marketing that shift towards justifications inherent to either a skill-based constructivist discourse or a human-environment-relations approach. This combination of outward changes and inward continuity implies the risk of promoting a diffuse environmental determinism as the challenges of integrating physical geography into a social science are not addressed.

Figure 3-3. Justification of educational objectives: volcanoes

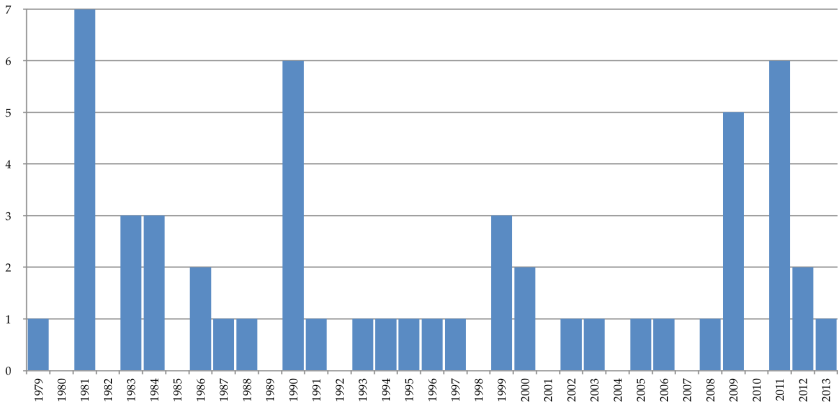


Weather

Over the time span of 34 years, the two teacher journals published a total of 54 papers that have a thematic emphasis on weather.

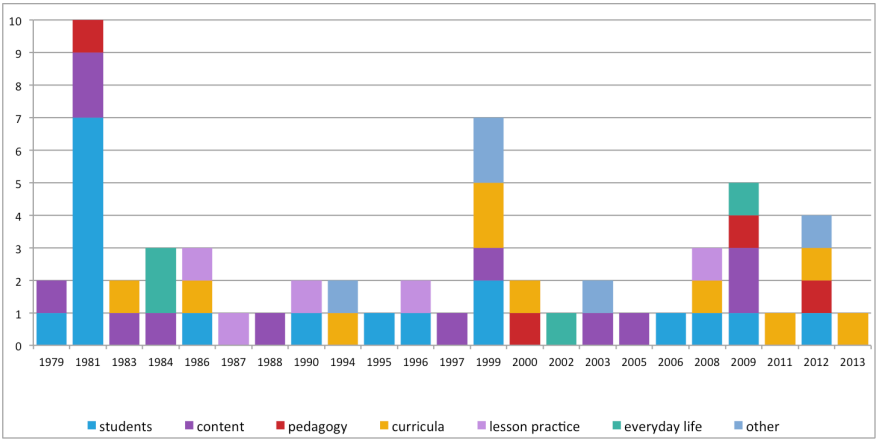
The number of papers per year (Figure 3-4) displays a rather continuous distribution over the decades. While the average number of papers per year is 1.54 and the mean is 1, the overall trend, as with the topic of volcanoes, shows a slow but steady decrease in numbers. Thus the highest counts of all decades can be found in the 1980s. This decade can also be characterized by an uneven distribution of publications, while in the 1990s and 2000s, when fewer articles were printed, their publication was more evenly dispersed with almost one article each year. In addition to this overall trend, there is a concentration of papers around the turn of each decade, hence a certain periodicity of special thematic issues can be discerned. The more even distribution of publications on the topic of weather may underpin its status as accepted physical geography, in contrast to volcanoes which can more readily be identified with geology. Yet, the decline in papers also indicates the fragile position of physical geography in the school context.

Figure 3-4. Number of papers/year dedicated to the topic "weather"



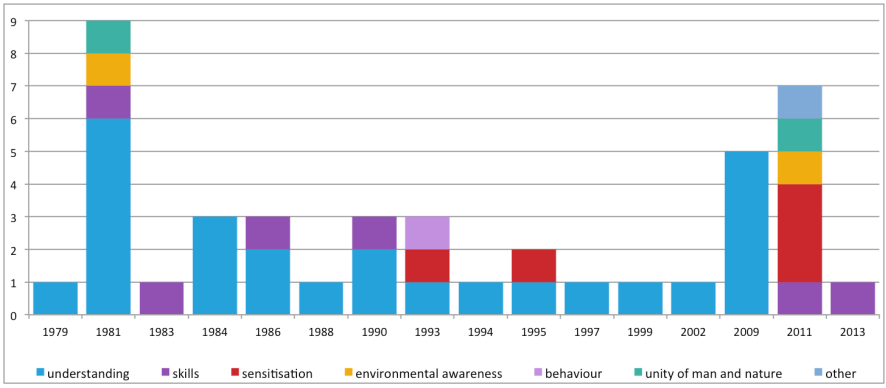
The papers display six categories of justifications regarding the choice of topic. Most authors argue that the needs of the students, the content, or the curricula require a thematic focus on weather (Figure 3-5). Lesson practice, pedagogy, and everyday life are additional justifications, but display fewer counts. From a time perspective, justifications turn away from both the needs of the students and content, although the latter experiences a comeback during the 2000s. Lesson practice loses its importance as a justification at a time when learning-to-learn approaches become more prominent within the educational debate. It is then substituted by pedagogy, which is mainly found in the 2000s. While justifications relating to everyday life are only sporadically used over the decades, justifications based on curricula remain surprisingly stable. Whereas the shift from content to lesson practice and pedagogy seems to follow an overall trend, the stable use of curricula as justification seems to support the view that the topic of weather is a core content of physical geography. The most challenging finding in this subset of data is probably the shift from justifications based on the needs of the students to justifications based on lesson practice and pedagogy. In combination with the correlation of justifications based on content with those based on the needs of the students, this may hint at the relevance of an F 3 curriculum to help students "become self-fulfilled and competent individuals, informed and aware citizens and critical and creative 'knowledge workers'" (Lambert 2011, 135).

Figure 3-5. Justifications of topic choice: weather



Content analysis reveals six categories of justification (Figure 3-6) when it comes to explaining the importance of the topic of weather in light of educational objectives. Overall, understanding is the most important justification. Additionally, skills and sensitization for the topic also play an import role. When considering the development over time, there seems to be a disruption in the beginning of the 1990s. In the years before this change the educational goals were mainly seen as understanding and the development of skills, but from the early 1990s onwards skills became almost obsolete, while sensitisation became more prominent. Only after an absence of 20 years were skills rediscovered as a possible justification, though this rediscovery coincided with a pronounced stress on sensitisation in the early 2010s. Other justifications, such as the unity of man, environmental awareness, and change of behaviour, are mentioned rather sporadically and without a clear pattern. In general terms, authors seem to replace understanding and skills with sensitization and skills, but also refer to complementary elements connected to environmental learning. Overall these changes seem quite similar to the changes observed in the treatment of the topic of volcanoes. Thus there is a continuing focus on understanding, which since the 1990s is accompanied by justifications inherent to either a skill-based constructivist discourse or a human-environment-relations approach, implying the same risk of a diffuse environmental determinism.

Figure 3-6. Justification of educational objectives: weather



Discussion

In a short reflection on the project of a "critical physical geography", the French geographer Dufour (2015) concludes that it is a rather pragmatic approach that considers the institutional proximity of natural and social or human sciences in geography departments to be an opportunity to deepen understanding. In his view, the approach lacks an epistemic framework that allows researchers to clearly define the role that physical geography plays in the conjunction.

The results from the analysis of the justifications of physical geography topics in school geography highlight similar problems. The first problem is related to the educational debate, the second problem parallels the debate in the academic discipline. The educational problem is partly due to the shift towards generic skills and the unsolved question of the role that subject knowledge generally plays within this context, leading to Michael Young's (2011) question of "What are schools for?" if not for introducing young people to knowledge that they would otherwise not encounter.

The other, less often discussed problem, which reflects the academic debate, can be expressed in a simple question: Does the fact that school geography covers both, natural and social sciences, lead to a better understanding? Or does it lead to an epistemology that supports explaining society through nature? If such a roll-back was to be avoided, a debate on the epistemic framework of physical geography in school geography would be necessary.

We would propose here to remember Lefebvre's warning that it is not possible "to found our knowledge of social practice, and the general science of so-called human reality, on a model borrowed from physics" as "this kind of approach has always failed in the past" (Lefebvre 1991, 13). We would also propose to consider the view Nussbaum put forward in relation to developments within the medical sciences, that "as biology changes medical possibilities, we must be constantly alert to the fact that some possibility that used to belong to the realm of chance or nature now might belong to the social realm, the realm shaped by justice" (1997, 181–182). In our understanding, the insights of physical geography, and not nature itself, can provide a sustainable background for debates and decisions in the social realm, but this realm is not and cannot be dominated by natural laws, as that would deny human agency (Möllers 2009). Especially in the school context, it is the obligation of geography to develop the democratic understanding of the students (Young 2011). In our view, the way physical geography has been integrated into German school geography over the last two decades does not support this obligation and we hope that the findings presented here will trigger an honest discussion not just of the role of physical geography at school, but also of what we expect of natural sciences in education in general.

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CHAPTER FOUR

MAPPING THE READING OF GRAPHIC VISUALISATIONS IN GEOGRAPHY TEXTBOOKS

Yvonne Behnke

Introduction

"Graphs, charts, cartograms… and thematic maps are common tools for handling and communicating quantitative information in contemporary society" (Åberg-Bengtsson and Ottosson 2006, 43). Modern school geography, as a discipline that intensely relies on media, often utilises graphic visualisations to communicate information (Haubrich et al. 2006). Consequently, current geography textbooks contain a high ratio of graphic visualisations, including maps, satellite images, diagrams, and infographics (Janko and Knecht, 2014).

Studies from pedagogical psychology, however, have revealed a disparity between the growing utilisation of graphic visualisations in learning materials and students' abilities to process information from graphics (Hochpöchler et al. 2012; Mayer 2010; Schnotz and Baadte 2014). Moreover, a 2013 Organisation for Economic Co-operation and Development study on adult literacy skills reported difficulties amongst more than 30 percent of the adult population in understanding complex graphic visualisations (OECD 2013). Furthermore, although the "multimedia principle" (Cognitive Theory of Multimedia Learning; Mayer 2009) states that adding graphics to text can improve learning, not all graphics in textbooks are learning effective (Sung and Mayer 2012).

Notwithstanding the widespread use of graphics in contemporary geography textbooks, little is currently known about learners' attention paid to them. Only a few studies have evaluated students' perceptions of maps and graphic outputs from GIS (e.g. Brus, Voženílek, and Popelka 2013; Brychtová, Popelka and Voženílek 2012; Ooms et al. 2012; Ooms, Maeyer, and Fack 2014). Although Janko and Peskova (2013) analysed types of visuals utilised in geography textbooks, and Janko and Knecht (2014) developed a research instrument for categorizing visuals in geography textbooks and assessing their instructional qualities, they also emphasised the need to conduct further research.

This chapter therefore takes as its horizons the investigation of potential learning-related challenges posed by complex graphic visualisations in geography textbooks by investigating the following questions:

1. To what extent do the participants pay attention to graphics while solving a task?

2. In what way does the information design of graphic visualisations influence the participants' visual attention to depicted graphics in geography textbooks?

For this purpose, interdisciplinary observation methods were applied to interlink aspects of geography education and information design with aspects of pedagogical psychology and textbook research.

Theoretical background

Knowledge acquisition from graphics is a highly complex process that often represents a multifaceted cognitive challenge to students wherein multiple representations of information must be decoded and interpreted in the respective learning context (Lowrie, Diezmann, and Logan 2011). Within educational psychology and instructional design, the term "multiple representations" is utilised for diagrams, graphs, formulas, symbols, text, gestures, videos, models, pictures, and sounds (Holsanova 2014).

Decoding and interpreting graphic visualisations relates to previous knowledge about symbol systems, graphic visualisation forms, and their production techniques (Åberg-Bengtsson and Ottosson 2006; Oestermeier and Eitel 2014). In addition, processing information from graphic visualisations requires the capacity for abstraction, such as the ability to both encode and decode spatial information from two-dimensional models and symbols (Schnotz, Picard, and Hron, 1993; Wilmot 1999). Decoding spatial information from two-dimensional models is a prerequisite for spatial orientation by means of maps and therefore a crucial ability in the context of geography. The ability to decode, analyse, and interpret graphics, as well as the capacity to generate graphic visualisations based on data, and to utilise these skills in contextualised tasks, such as spatial orientation by means of maps, is referred to as "graphicacy" (de Vries and Lowe 2010; Boucheix et al. 2013; Bétrancourt et al. 2012). Therefore, graphicacy can be understood as a complex form of communication, as intellectual skill, and as competency. Graphicacy is then a prerequisite for understanding information visualisations in geography textbooks.

One possibility for visualising graphic information in geography textbooks is to utilise methods and design principles from information design. As computer scientist Ben Sneiderman has stated, "The purpose of information visualisation is insight, not pictures" (Ben Shneiderman quoted by Fotaris 2015, 9). This is also

suitable to describe purposes of professional information design. However, there is currently no consensus regarding how exactly the term "information design" should be defined (Knemeyer 2006). Horn has stated that information design is "the art and science of preparing information so it can be used... with efficiency and effectiveness" (1999, 15), whereas according to Tufte, information design describes, explores, and summarizes information (2013). In sum, professional information design may visualize and communicate complex information (data or ideas) in a clear, memorable, understandable manner that attracts curiosity and attention (Knemeyer 2006; Smiciklas 2012; Uyan Dur 2014). Attention may play a crucial role in processing information from graphic visualisation because visual attention is the first step in visual perception processes, even before sensory registration and cognitive processing of a visual stimulus (Geise 2011).

Eye movements reflect human thought processes (and also visual attention processes) and thus, they offer a "window to the mind" (Holsanova 2014, 317). Eye tracking, as a non-reactive reception concomitant method, allows the recording of participants' eye movements while observing a stimulus, thereby gaining insight into the process of media reception (Geise 2011; Holmqvist et al. 2010; Duchowski 2007).

With eye tracking, two types of eye movements (saccades and fixations) can be recorded and analysed. Saccades are rapid eye movements from one area of interest to another when the visual perceptiveness is severely limited. During a fixation, the gaze stabilizes over one area of interest, which enables the visual perception and cognitive processing of visual information (Duchowski 2007; Joos, Rötting, and Velichovsky 2003). Visual perception processes consist of a complex interplay between saccades and fixations. During this highly automatic process, relevant details are selected. For conscious perception and cognitive processing of images, a fixation duration from about 330 milliseconds shall be assumed (Joos, Rötting, and Velichovsky 2003; Geise 2011).

Two theoretical assumptions underlie the eye tracking methodology. The "immediacy assumption" suggests that visual information will be processed immediately when the information is encountered, and the "eye-mind assumption" states that processing visual information is closely linked to the focus of visual attention (Just and Carpenter 1980). Even though the absoluteness of the eye-mind assumption has been discussed for some time (Hyönä 2010), there is a widespread agreement on a relationship between visual perception, visual attention and cognitive processing of information (Holsanova 2014; van Gog and Scheiter 2010; Hochpöchler et al. 2012).

However, eye movement patterns are highly individual and may vary according to task parameters (Rakoczi 2012). Moreover, eye tracking only depicts which areas are observed and with what intensity, but not the results or why areas are not observed (Rakoczi 2012; Voßkühler 2010). Therefore, it is necessary to triangulate eye tracking with additional evaluation methods (written evaluation, questionnaire, textbook analysis) and to interpret eye-tracking data in relation to findings from other research fields (e.g. pedagogical psychology, information design).

Method and Random Sampling

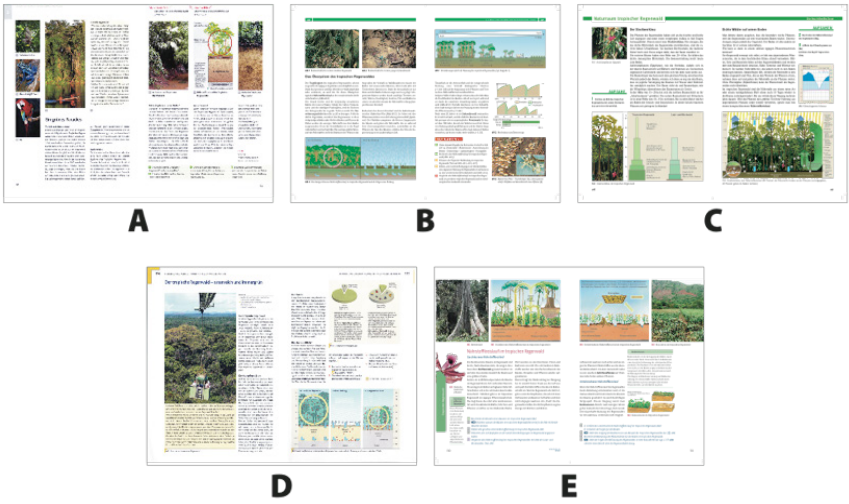
Participants

In an exploratory random sample, eye movement data from 20 students (eight from secondary school, 15–17 years old; twelve university students 20–24 years of age; total M=19.3; SD=2.78, three male) were analysed. The university students were enrolled at Potsdam University, Germany in psychology, linguistics, biology or French language. Geography students were excluded from the study because it was not the aim of the study to focus on expert knowledge. The secondary school students came from different schools in the federal state of Brandenburg, Germany (grade nine to thirteen). Twenty-two students participated in the experiment for either payment (10 euro) or course credit. Recorded data from two participants had to be excluded from the analysis because of missing data. Thus, data from 20 participants was analysed.

Materials

Participants' eye movements were recorded by an EyeLink® 1000 (desktop mount) with a 1000–Hz sampling rate. The stimuli were comprised of five double-page spreads of German geography textbooks (2012–2013) from different German federal states covering an identical topic (the nutrition cycle in tropical rainforest) taken from five separate textbooks (Figure 4-1).

Figure 4-1. Material used in research (A-E)[1]



For each selected textbook spread, the content was presented utilising similar elements: text, graphics, and photos. However, they differed with regard to their layout and their visual and textual content presentation. Furthermore, to ensure the comparability of the textbook spreads with regard to the participants' attention paid to the depicted graphics, the topic "nutrient cycle in tropical rainforest" was selected on the grounds of the following criteria: (1) the topic is covered in the curricula for secondary schools of all German federal states, (2) the topic is developed through similar tasks, and (3) the topic had already been taught in the geography lessons of the participants. Due to the German federal education system, the topic "nutrient cycle in tropical rainforest" is covered in different grade levels (between six and nine) in several federal states. Therefore, the selected textbook spreads had been derived from textbooks of grade 9/10 (Berlin, Berlin/Brandenburg), grade 7/8 (Lower Saxony, Saarland) and grade 5/6 (Hessen). However, the selected grade 5/6 textbook spread from Hessen was printed identically in the grade 7/8 Edition for North Rhine-Westphalia (using textbook spreads with identical topics from editions of different federal states or different grade levels is a common practice of schoolbook publishers in Germany).

Procedure

A two-stage test with randomised test sequences was developed. Each participant observed five different textbook spreads in full colour in a random order on a screen.

In the first stage, participants were given the task of observing the entire textbook spread to determine the issue explained on the textbook spread; meanwhile, participants' eye movements were recorded. During the second stage, the same spread appeared a second time and the participants completed one given task from the exercise section while the participants' eye movements were recorded a second time. No time limitations were imposed during any of the test stages.

Based on the selected test tasks of spread A-E, "areas of interest" (AOI) were defined. AOIs allow separate data recordings of each marked element (dwell duration, first entry, fixation count, order of observed AOI). In this study, AOIs were all textbook elements (graphics, photos, text) that contain information to solve the set task and all textbook materials which refer to the set task.

Eye tracking recordings demonstrate which areas of a textbook spread were observed and how intensely, but not with which result a task was completed. Therefore, after completing the task on the screen, the participants were asked to write down the task solution in keywords on an evaluation sheet. This evaluation sheet was collected directly after notation, thus no notes to previously observed textbook spreads remained with the participants. Overall, each participant observed five different textbook spreads (A-E) in two test stages, and completed five set tasks.

After completing the eye tracking examination, each participant completed a questionnaire. The questionnaire aimed to analyse the participants' preferences with regard to textbook design. This will be further specified in the results section.

In the following, the recorded eye tracking data will be aligned with the questionnaire and a textbook analysis of spreads A-E. Hereafter, the research results will be associated with educational psychology insights as well as with insights derived from information design and textbook analysis.

Results

Within this paper, the data analysis will focus on the participants' visual attention to depicted graphics in the examined textbook spreads (A-E). The discussion will focus on possible relations between participants' preferred textbook design (Table 4-4), participants' visual attention paid to graphic visualisations (Figure 4-2, Table 4-3), and the content of depicted graphics (Table 4-1).

Textbook analysis

To analyse how external characteristics (size, image-text ratio) and image content of depicted graphics might influence participants' attention while observing the textbook spreads, graphic proportion and graphic content of spreads A-E were determined by methods of textbook analysis (Table 4-1).

Table 4-1. Graphics proportion and graphic content (spreads A-E)

	Number of depicted grapics/ Caption	Size in mm	Proportion of the spread in cm^2/ in %		Content
A	1 graphic M7	57 · 93	53.1	5.2	*infographic* nutrient cycle
B	3 graphics 68.2* 69.1* 69.2	 162 · 60 162 · 55 78 · 65	237	22.3	 *infographic* nutrient cycle *infographic* rainforest deforestation *diagram* fallow period and crop yields
C	3 graphics M2 M3* M4	 163 · 98 163 · 98 51 · 55	347.5	27.9	 *illustration* + *diagram* vegetation levels *infographic* vegetation levels + nutrient cycle *climate diagram* Manaus
D	2 graphics M2 M3*	 95 · 112 170 · 90	259.4	20.8	 2 *pie diagrams* treasure chamber rainforest *infographic* nutrient cycle
E	3 graphics M3* M4 M6	 100 · 85 100 · 85 65 · 30	189.5	17.8	 *infographic* closed nutrient cycle *infographic* interrupted nutrient cycle *scheme* soil erosion

*= This graphic was mentioned in the task

The textbook analysis revealed that in many cases information contained in graphics was also provided in the text. Spreads B-E contain 16 references between depicted graphics, text and tasks. Spread A does not contain any reference between related textbook elements (photos, graphics, text, additional text boxes).

Eye Tracking Data

The eye-tracking test provided static visualisations (heat maps, gaze plots and trains of vision as PDF-files), dynamic visualisations (gaze replays as mp4–files) and numerical datasets (dwell duration, AOI).

Table 4-2. Stage 2 (task): fixation count

	A	B	C	D	E
Text	479	567	366	573	593
Headlines	4	19	8	0	8
Captions	26	42	17	8	23
Tasks	213	351	106	184	175
Additional Textboxes	48	–	–	0	14
Photo 1	1	1	1	3	1
Photo 2	0	25*	–	–	2
Photo 3	4	7	–	–	4
Photo 4	2	1	–	–	–
Photo 5	10	–	–	–	–
Photo 6	6	–	–	–	–
Graphic 1	398	64*	19	34	182*
Graphic 2	–	67*	111*	94*	18
Graphic 3	–	15	12	–	1

*= This graphic/photo was mentioned in the task

– = no further resources (photos/graphics, links) were depicted

The static and dynamic data visualisations are graphical representations of the recorded eye tracking data. They allow researchers to retrace visually the participants' eye movements while observing the textbook spreads. Furthermore, visualisations provide a first impression of the intensity with which areas of the

textbook spreads were observed and which textbook elements were not, or were only superficially, observed. (Figure 4-3, Figure 4-4).

A fixation duration of about 330 milliseconds is assumed for conscious visual perception and conscious cognitive processing of visual impressions (Joos, Rötting, and Velichovsky 2003; Geise 2011). Therefore, Table 2 depicts the number of counted fixations from 300 milliseconds on spreads A-E added over all 20 participants for each page element (photos, graphics, and text) and reveals how frequently the participants fixated on certain points on the page while solving the task.

Table 2 reveals the participants' visual focus on the text elements of spreads A-E, since on all the five tested textbook spreads most fixations were counted on text elements (text, task).

Figure 4-2 represents the mean dwell duration (in seconds) of all 20 participants on spreads A-E in both stage 1 (content comprehension) and stage 2 (task).

Figure 4-2. Mean dwell duration in seconds[2]

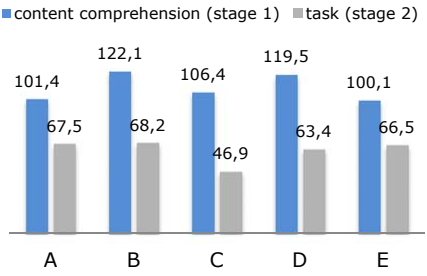


Table 4-3 demonstrates the mean dwell duration of all 20 participants on the AOIs (textbook elements that refer to the set task) in stage 2. Fixations from 100 milliseconds were recorded.

Table 4-3. Mean dwell duration on AOIs in stage 2 (task) in seconds

	A	B	C	D	E
Tasks	4.84	6.97	3.16	4.74	3.23
Text	17.32	14.23	17.73	18.11	19.98
Headline	0.21	0.70	0.34	0.08	0.94
Graphic 1	11.66	3.44	6.64	4.43	9.01
Caption graphic 1	1.21	0.76	1.11	0.36	0.48
Photo	–	0.57	–	–	–
Caption photo	–	0.23	–	–	–
Graphic 2	–	3.39	–	–	–
Caption graphic 2	–	0.77	–	–	–
Total	35.24	31.06	28.98	27.72	33.64

– = No further resources (photos/graphics, links) were depicted

Written evaluation

Using a questionnaire, participants assessed the visual quality of the examined textbook spreads A-E (Table 4-4) for possible preferences with regard to the design of the pages. Therefore, participants allocated ranks ranging from one (first) to five (least) for each of the five textbook spreads in five categories: design, comprehensibility, graphics, text, and orientation. Thus, the lowest number of points represents the best rating. Consequently, the best overall value per category is 100 points = mark 1,0 (20 participants; five categories, each ranked with one).

Table 4-4. Evaluation Questionnaire[3]

	Design	Graphics	Text	Comprehensibility	Orientation	Total
A	72	73	63	69	72	349
B	62	63	59	66	66	316
C	60	47	48	47	49	251
D	68	77	76	67	65	353
E	38	40	54	51	48	231

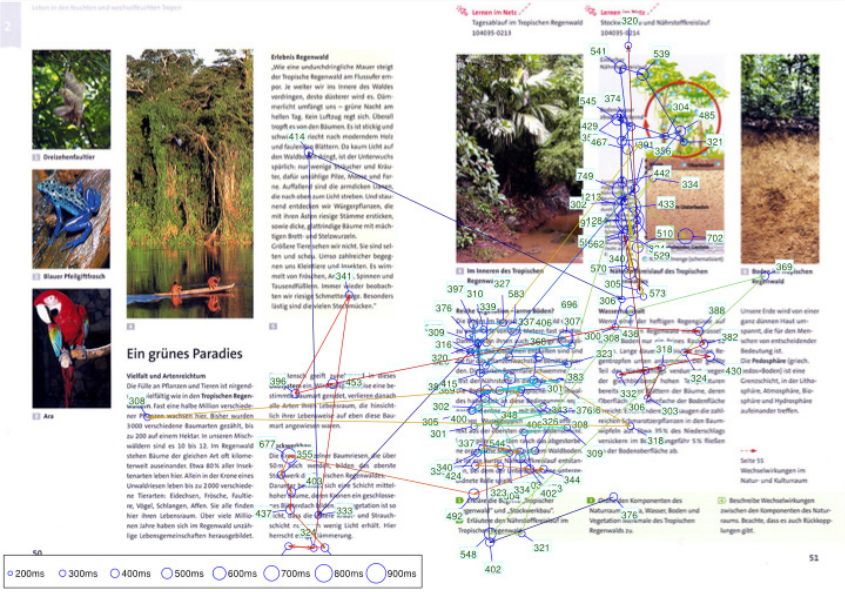
As indicated by the questionnaire evaluation (Table 4-4), spread E obtained the best overall score of 231 (mark 2,31), spread D (353 points, mark 3,53) achieved the worst score, and spread A (349 points, mark 3,49) received the second lowest score. A preference for the textbook design of spread E might be apparent from the comparative distance to the second bestest ranked spread (spread C, 251 points, mark 2,51) as well from the rating for the categories design (39 points, first rank) and graphic (first rank, 40 points). However, none of the analysed textbook spreads A-E obtained a very good rating (1,0–1,5).

Upon closer analysis of the category graphic, it becomes evident that the overall ranking of the graphics mirrors the overall ranking of the textbook spreads (1 E, 2 C, 3 B, 4 A, 5 D). This may indicate the design and content of depicted graphics as crucial factors (among others) for the participants' preference to a certain textbook design. However, when the ranking of the graphics (Table 4-4) is compared with the textbook analysis (Table 4-1), it is apparent that the spreads containing the lowest ranked graphics, D (68 points) and A (72 points), differ significantly with regard to their external characteristics. Therefore, spread A (Figure 4-3) and spread D (Figure 4-4) will be analysed and compared with each other hereafter.

Discussion and implications for research

The gaze plot (participant 8; Figure 4-3) illustrates a visual pattern of how many participants observed spread A during completing the task: visual attention to the text section, little less attention to the depicted graphic, and hereof a considerable amount of fixations on the text section of graphic M7. Spread A contains only one graphic (infographic M7), which is the least number of utilised graphics and, in terms of size, one of the smallest (57 mm • 93 mm) from the tested textbook spreads A-E (Table 4-1). The purpose of infographics is to illustrate and clarify issues so that learners can more easily conceptualise and understand complex structural aspects, stages of a process, or effects and causes of an action (Holsanova, Holmberg, and Holmqvist 2008).

Figure 4-3. Gaze plot for spread A while completing the task (P 8)[4]



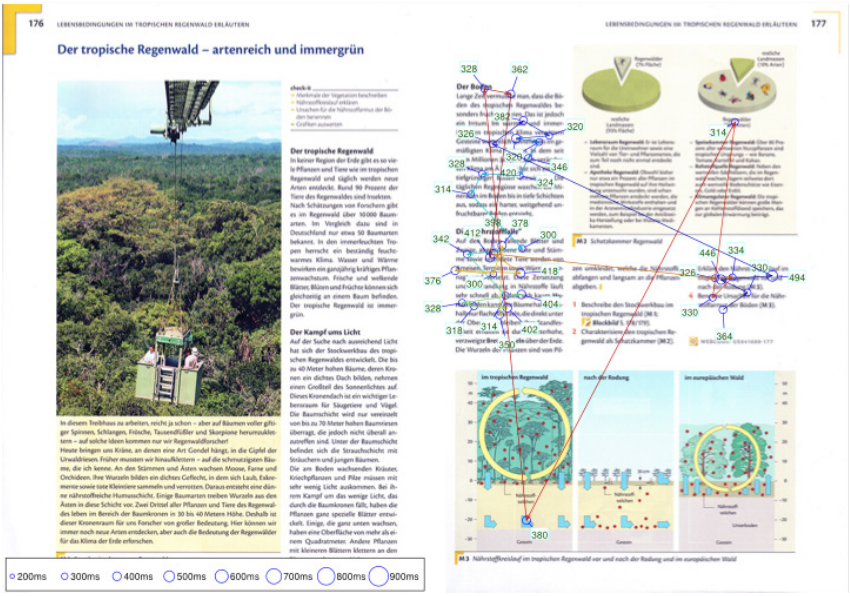
Analysing the proportion of graphics (5.2%) relative to the whole textbook, spread A demonstrates the smallest page space for graphics. The analysis of spread A (Figure 4-3) revealed that info-graphic M7, compared to the depicted size, is highly detailed and includes a text passage in a small font size. Notwithstanding the task that does not refer to the graphic, 398 fixations were counted on M7 while solving the task, which is by far the highest number of fixations, determined on a graphic of spreads A-E. Thus, a high proportion of fixations were identified on the text section of graphic M7 (Figure 4-3).

Altogether, the participants spent an average of 67.5 seconds on spread A while solving the task (Figure 4-2); 11.66 seconds were spent on graphic M7 (Table 4-3), which is the longest dwell time of all examined graphics. Nevertheless, participants dwelled the longest time in the text section (17.32 s = 40.77% of AOI dwell time). Not-withstanding the large attention span for graphic M7, spread A obtained the second poorest rating in the category "graphic" on the questionnaire (Table 4-4). One possible explanation for the contradiction between participants' high degree of visual attention paid to graphic M7 and participants' poor rating for graphic M7 might be found in the "attention-comprehension-gap" (St. Amant and Meloncon 2015: Particularly for graphics, St. Amant

and Meloncon (2015) revealed a gap between infographics, drawing users' attention to specific content and users' content comprehension. Further explanations might be found in the richness of details in graphic M7 compared to the depicted size and the lack of (visual and textual) references between related textbook materials. Participants' poor rating for "comprehensibility" and "quickest for finding information" (Table 4-4) may indicate that they perceived some difficulties in identifying the relevant information to completing the set task.

Spread A demonstrates a classic German textbook layout consisting of two narrow columns, supplemented by a rather wide margin column. The typographic concept is characterised by a classic sans-serif typeface, justified print, and few mark ups. A closer look on the visuals reveals six photos in small size depicting rather familiar or uninspiring photo motifs besides the above-discussed graphic M7. To summarize, spread A lacks salient elements and suspenseful layout characteristics. The participants rated the design of spread A with the poorest ranking (72 points).

Figure 4-4. Gaze plot for spread D while completing the task (P 19)[5]



Spread D contains two graphics, that is, the second smallest graphic-proportion. Contradicting this, the size of the depicted graphics M2 (95 mm • 112 mm) and M3 (170 mm • 90 mm) is relatively extended compared to spreads A-E. Therefore, the proportion of graphics for spread D (20.8%, Table 4-1) ranks in the middle (average = 23.1%). Graphic M2 (treasure chamber rainforest) contains two reduced and clearly designed pie graphs, but with added large text passages in a small font size. This representation form is known as a "paired graphic". Paired graphics are the most frequently depicted graphics in learning materials (Boucheix et al. 2013). The purpose of paired graphics is to compare content to identify similarities and differences. Notwithstanding, the set task does not refer to graphic M2; several fixations (34, Table 4-2) were identified on graphic M2 while completing the set task.

The infographic M3 (nutrient cycle) is one of the largest (170 mm • 90 mm) in the analysed textbook spreads. The content analysis of M3 reveals that the infographic includes three different graphics (nutrient cycle in tropical rainforest, rainforest deforestation, and nutrient cycle in a European forest). Thus, M3 represents three different aspects of one topic in the infographic, which significantly increases the complexity of graphic M3. To solve the task, participants had to analyse and decode each of the three parts, then identify similarities and differences, and finally align the result with the task to determine which of the depicted information is relevant for completing the set task (Bétrancourt et al. 2012; Boucheix et al. 2013; de Koning et al. 2010). Although the set task of spread D refers to graphic M3, only 94 fixations total were counted on M3 while completing the task (Table 4-2).

All in all, the participants dwelled an average of 63.7 seconds on spread D while completing the task, of which only 4.43 seconds were spent on graphic M3, whereas participants dwelled 18.11 seconds on the text section. One possible explanation for the participants' dwelling on the text section during completing the task might be found in the fact that information depicted in graphic M3 was also provided in the text section. Participants' poor rating for "graphics" (least) "comprehensibility" (second least) and "design" (second least) (M4), in combination with the limited attention paid to the depicted graphic M3, might indicate that the information design (especially of graphic M3) induced some difficulties while completing the set task. In this context, the information designer Edward Tufte (1990, 53) stated, "Confusion and clutter are failures of design, not attributes of information."

The most salient layout elements on spread D are long, narrow copy text columns and a few depicted images in relatively extended size (one photo, two

graphics). These characteristics might be an indicator that the textbook design of spread D is inspired by magazine or newspaper layouts. However, the textbook design of spread D obtained, with 68 points, the second poorest rating (Table 4-4). Therefore, it might be concluded that layout concept adoptions of other print media (e.g. newspaper, magazine) should not only consider aesthetic criteria, but also very carefully adjust to the requirements of the students (e.g. grade level, school type). In this context, studies have revealed that innovations (e.g. new textbook concepts or new textbook design) cannot be successfully implemented without considering users' attitudes and preferences (Joo et al. 2014).

Ultimately, the data analysis of spread A and spread D may verify the design of graphic visualisations as one important influence factor (amongst others), as it may foster (or hinder) information processing from graphic visualisations in geography textbooks.

Policy and practice

It can be concluded that a coherent presentation of graphic information (in the graphics themselves as well as the positioning of graphics in textbook layouts) could be one crucial factor for a successful integration of graphics. This would be in accord with Holsanova, Holmberg, and Holmqvist (2008), who investigated visual attention processes and reading behaviours of information graphics in a naturalistic newspaper reading study and confirmed the crucial role of layout on readers' eye movement behaviour while reading information graphics.

Therefore, several aspects need to be considered. For example, graphics should only contain relevant information related to the task and to the overall topic of the textbook spread and should not include too many different aspects of one topic in the same graphic. External characteristics (e.g. size, arrangement, quantity) should relate to content and a learning-fostering layout (Oestermeier and Eitel 2014). To foster knowledge acquisition through graphics, they should be visually, textually, and contextually linked to related textbook elements (e.g. task, text, photos), and the overall content should complement each other (Pettersson 2015; Hegarty 2011). Consequently, the above-mentioned aspects underline the crucial role professional information design may play in presenting graphic information in textbooks.

Furthermore, the eye-tracking investigation revealed a disparity between the number of graphics utilised in the analysed geography textbooks and the participants' visual attention to depicted graphics. Interestingly, graphics were often looked at rather superficially. Even when the set task referred to a certain

graphic, a general focus on text was identified—however, the textbook analysis revealed that in many cases information contained in graphics was also provided in the text. This enabled the participants to choose which representation to include in completing the set task (i.e. text, text and graphic, graphic). Possible explanations for participants' preference for text might be found in the reading socialisation in present school teaching (Oestermeier and Eitel 2014) and in the task structure of the analysed textbooks. In many cases, the outcome of the task is anticipated in the provided keywords. Therefore, the easiest and most likely way to succeed at the task might be to "scan" the text section rather than to analyse the graphics. It may also be the least straining insofar as analysing and decoding complex infographics causes higher cognitive load than reading text (Hochpöchler et al. 2012; Oestermeier and Eitel 2014; Ullrich et al. 2012).

However, as school geography is a subject that heavily relies on graphic visualisations, the adequate utilisation of graphics could influence learning outcomes (Schnotz, Picard, and Hron 1993). Likewise, studies from pedagogical psychology reveal that knowledge acquisition through graphics and text in combination is more successful than through text or graphics in isolation (multimedia effect), but processing information from graphics must be learned and practised (Ullrich et al. 2012; Eitel and Scheiter 2014). Contradicting this, in several cases, the textbook analysis revealed a lack of clear instruction in tasks referred to graphics (e.g. which aspects of the graphic should be analysed or compared; spread D, task 4). This corresponds to studies that highlighted a lack of support for graphicacy in textbooks (Milner and Hill 2008; Bétrancourt et al. 2012). However, knowledge acquisition through graphic visualisations is a complex process that may be affected by various factors such as previous knowledge, students' interests, students' learning strategies, graphic-specific literacy skills, and information design that promotes learning (Ainsworth 2006; Aldrich and Sheppard 2000; Scheiter et al. 2015; Schnotz et al. 2011; Schnotz and Baadte 2014). Therefore, further research is required, especially considering successful knowledge-acquisition strategies through graphics and learning-fostering design of graphics in textbooks.

In conclusion, the experiemental results, which this paper sought to explicate, aimed to analyse students' visual attention paid to graphic visualisations depicted in textbooks—it explicitly does not look to measure learning outcome. A number of possible limitations in the present study should be taken into account. First of all, only one type of graphic (infographic) was evaluated. Therefore, before any final conclusions and recommendations, a broader research sample is needed with a wider range of graphics (e.g. maps, diagrams, statistics). Further limitations might be found in the small sample size (n = 20), the heterogeneous

sample composition, the heterogeneous stimuli, the lack of a prior knowledge test, and the design of the questionnaire (only five questions). Furthermore, the research design (five textbook spreads on the same topic) might affect participants' attention to the depicted graphics. For these reasons, based on findings of the exploratory random sample, a further eye tracking study with a larger sample and improved research design is currently in preparation.

Notes

[1] Image Sources: **Spread A**: Krause, K., S. Werner, *Terra Geographie 9/10 Berlin und Brandenburg*. Stuttgart: Klett, 2013: 50–51. **Spread B**: Felsch, M., H. Heß, U. Marth. *Seydlitz 9/10 Geographie Berlin*. Braunschweig. Schroedel, 2012: 68–69. **Spread C**: Heit, E., M. Ernst (ed.). *Diercke Erdkunde Saarland Gymnasium 7. Schuljahr.* Braunschweig: Westermann 2012: 26–27. **Spread D**: Flath M., E. Rudyk (ed.). *Unsere Erde Hessen 1. Berlin*: Cornelsen, 2012: 176–177. **Spread E**: Bahr, M. et al. Durchblick. *Erdkunde 7/8. Niedersachsen. Differenzierende Ausgabe.* Braunschweig: Westermann, 2013: 110–111.

[2] Own figures and calculation.

[3] Own calculation.

[4] Own figures and calculation. Background image: Spread A (above).

[5] Own figures and calculation. Background image: Spread D (above).

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CHAPTER FIVE

HISTORY WITHOUT NATION: PROBLEMATIC POSITIONS IN HISTORY EDUCATION

Bengt Schüllerqvist

Introduction

In a discussion with several renowned researchers from English-speaking countries at a conference on history education some time ago, I argued that it was reasonable that elected politicians, not researchers, should have the final say about the national curriculum, including the subject of history. The spontaneous response from one of the party was: "But they are idiots."

To me, used to forms of discussion in Sweden and the other Nordic Countries, the comment was a strange one. Of course, I have heard scholars criticize politicians, but this critique was of a stronger and more general kind. How should it be understood? My discussion partners were prominent actors in an academic setting that could be labelled "History Education", i.e. research and academic discussions on school history among English speaking scholars[1].

Swedish research on school history has been influenced mainly by the German tradition of "Geschichtsdidaktik". During the last years, however, perspectives and conceptual tools from History Education have been used. Several licentiate and doctoral theses, inspired by Anglophone scholars, have been produced lately (e.g. Lilliestam 2013; Berg 2014; Johansson 2014). As a tutor of graduate students and a participant in Swedish academic discussions, I have argued for the need to strengthen links to History Education. This is grounds for critically reviewing and problematizing different elements and perspectives of History Education.

In recent years, the status and future of history as a subject in various countries has been discussed at several noted international conferences. Participants in these conferences are among the best known and respected scholars in History Education—An investigation of the discourse of History Education could start by examining the arguments put forward at these conferences. Three volumes from such conferences are *Beyond the Canon: History for the Twenty-First Century* (Grever and Stuurman eds. 2007), *National History Standards: The problem of the Canon and the Future of Teaching History* (Symcox and Wilshut eds. 2009) and *History Education and the Construction of National Identities*

(Carretero et al., eds. 2012). Two of these volumes are published in a special publication series, *International Review of History Education*, edited by leading British history education scholars Lee, Ashby and Foster. Two additional publications in this series are included in my analysis, since they deal with similar topics: *Contemporary Public Debates over History Education* (Nakou and Barca, eds. 2010), and *History Wars and the Classroom: Global Perspectives* (Taylor and Guyver, eds. 2012).

Primarily, this paper examines arguments advocated by the conference organizers and anthology and series editors, who write the introductions to each volume. With a term drawn from the sociology of literature, these influential actors can be regarded as the "gatekeepers of the discourse" (e.g. Griswold 2012). What goals do the gatekeepers claim that history education should have, what arguments are proposed, and what is their agenda for history education? What are the main questions of debate in History Education?

The value hierarchies of the debaters

Inspired by Bourdieu, I seek to understand History Education as a field in which different contributions can be situated and their interrelations understood[2]. A "field" in the Bourdiean sense refers to "the polarity between different camps and competing value hierarchies" (Broady 1998, 16). The cultural field that Bourdieu describes is characterized by two dominant value hierarchies, and this results in a fourfold field in which the positions of actors and groups of actors can be described. Can such hierarchies of values be identified within History Education?

The British scholar, John Slater, names the goals of history education that rest on history as an academic discipline as "internal goals" of the subject, while goals of another kind are called "external goals" (Slater 1995, 125–126). Slater, and other researchers (Husband et al. 2003, 29) using this terminology, emphasize that these other goals are added to every academic area that is turned into a school subject, and that such external goals involve how pupils are expected to use the subject knowledge. These goals are of a political nature, and differ in time and place according to dominant ideologies. Can such internal and external goals be used to understand the character of the discourse and the cultural field of History Education?

Carretero et al. (2012) argue, in the introduction to their volume, that there are three dominant approaches within the field of History Education: These are

termed "the romantic approach", the "empirical approach", and the "civic approach". The romantic approach is defined as follows:

> "The 'romantic approach' of the mid-nineteenth century promotes national identity and social cohesion within a world that is organized into nation-states" (Carretero et al. 2012)

The romantic perspective, then, emphasizes and justifies purportedly national values. On the other hand, the "civic approach" focuses on developing pupils' competence as citizens in a democratic society. The emphasis here is on the value of democracy as a form of government. These two approaches clearly manifest external goals, while the final approach, the "empirical approach", is representative of internal goals insofar as it refers to a research and school development tradition that advocates an academic understanding of school history.

Similarly, Symcox and Wilshut (2009, 5) identify three strands in "History Education":

1. The "traditional or conservative trend", which tries to present an uncomplicated uniform national narrative to inculcate citizenship and patriotism.

2. The "progressive 'modern world' trend", which strives for a pluralistic curriculum from a global point of view, offering space for a multicultural approach to the past.

3. The "educationalist 'teaching of history' trend", which is not as much concerned with the desired factual content of the curriculum but stresses the value of the historic discipline as such, implying a key role for historical thinking and disciplinary concepts.

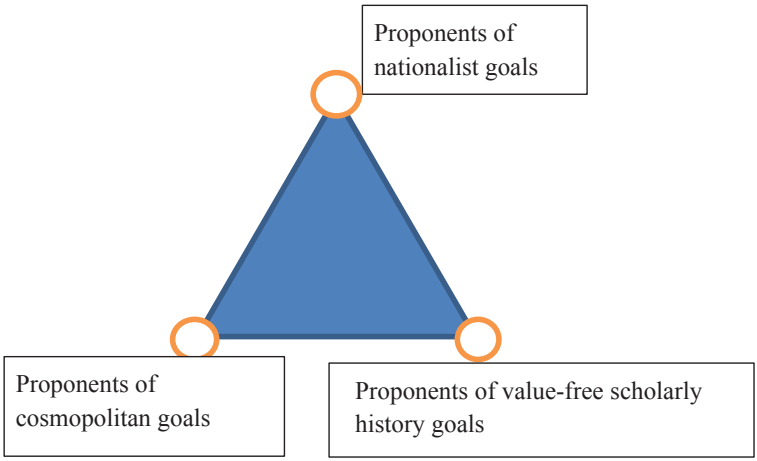
Although somewhat different terms are employed, I see the traditional strand as being identical with what Carretero et al. (2012) denoted as the "romantic" approach, which gives priority to national patriotism. The orientation that Symcox and Wilshut call "progressive" also underlines political goals but of a global kind. Meanwhile, the third strand, termed the "educational trend", I perceive as synonymous with the "empirical approach", which Carretero et al. (2012) describe as centering on internal goals. Both cases point out internal and external goals as value hierarchies for the field of History Education.

The field of the discourse as a triangle: The central role of nationalism in the field

Fields in the Bourdieuan sense take the form of a quadrangle, based on two value hierarchies. A close reading of the gatekeepers' arguments, however, leads to the interpretation that the field of History Education can be represented by a triangle. The reason for this is that the same opponents are singled out by authors from both internal and external camps of argumentation; for both groups, the 'common enemy' in the discourse are the advocates of nationalistic arguments.

The field of positions appears as:

Figure 5-1. The field of History Education at international conferences



A value-free scholarly history goal

Both the "empirical approach" and the "educationalist trend" refer, in part, to a British history education tradition, which, since the 1970s, has been designated "New History". Gradually, this tradition has influenced researchers in many countries, not least within the British Commonwealth. Researchers of this persuasion analyze different aspects of a scholarly understanding of history and seek to develop concepts and methods to enhance history teaching in this respect[3]. Lee, Shemilt, and Ashby, veterans and leading figures in British New History, were key speakers at the Swedish national conference on history education in 2012. In the final panel discussion, with questions from the audience,

they argued not only for a stronger academic approach in history teaching, but also for the view that politically chosen value goals should not be involved at all.

For many of the Swedish conference attendees, newcomers to History Education, the speakers' consistent argumentation for a completely value-free history teaching no doubt came as a surprise. In the English-speaking research community, this view is well known. Symcox and Wilshut comment on this in the introduction to their volume: "Shemilt and Lee reject the role of history as a tool for citizenship or identity formation". In the anthology material, it is above all Lee, who—in his capacity as the author of the introductory texts to the series—argues for this objectivist goal. Lee regards value-based goals, including democratic values, as incompatible with the principle of historical study (which according to him should be the commitment to history). In his preface to *History Education and the Construction of National Identities*, Lee claims:

> "If teaching history is the goal, then we cannot promise that success will produce democrats, patriots or anything else. If we teach history as history we will be handling on cognitive ethics (respect for evidence, respect for persons as sources of arguments and so on) which are closely related to democratic values. But this does not mean that a study of history will ensure that students will believe that democracy (and especially any particular current version of representative liberal democracy) is the only, or even the best way in which societies should be organized. Were we to take seriously the claim that the overriding aim for history education is to produce liberal democrats, we would have to "fix" any version of the past that failed to deliver that goal. That would mean abandoning the commitment to history. *We cannot simultaneously guarantee both the history and the liberal commitment…*" (My italics; Lee 2009, xii).

Lee has a definite idea of the future conception of history:

> "We cannot imagine what social and political forms may exist in the future, because we cannot predict future knowledge, but it is difficult to imagine a future in which people would not want knowledge of the past. And if we admit that knowledge claims must meet criteria which go beyond their convenience for any particular society, we must anticipate that something like history will continue to exist: that is a public form of knowledge, not the property of any individual, local region, ethnic group, gender or religion. … Stories produced by history are not

> designed to do the same job as community or national or sectarian stories" (Lee 2009, xiv).

Taylor, the co-editor of *History Wars in the Classroom*, has an ideal view of the history subject similar to Lee's, and wants to defend "the disciplinary integrity of history" (2002).

It is worth noting that researchers in History Education are frequently making efforts to strengthen the internal goals of history teaching—i.e. academic-oriented goals—without expressing the same radical position as Lee, that is, the total liberation of education from national interests.

A cosmopolitan goal

Several authors published in the anthology collections advocate a greater inclusion of international history in teaching. The most radical argument is the complete elimination of the national perspective. Symcox, co-editor of *National History Standards*, appears as the most striking proponent of this position. Her line of reasoning builds on the premise that the world *is* globalized and *is* post-national and therefore history teaching with nations as the object of study should be replaced with a global perspective.

> "The curriculum I propose should treat history as global, not national (Symcox 2009, 43).
> /---/
> The problem I want to address here is how to revitalize the trend towards a cosmopolitan history curriculum, because I believe it is necessary in the globalizing, post-national world we now inhabit" (Symcox 2009, 34).

Symcox was one of the authors of a reform bill suggesting national norms for history teaching. She describes how, with Lynne Cheney as the leading actor, a campaign for patriotic values led to the Senate rejecting a proposal on national norms for history teaching, with 99 votes to 1, in 1995. Symcox claims that Cheney's criticism of the proposal was its

> "…failure to uphold patriotic values, for devoting too much space to the history of women, minorities and the poor, and for what she termed 'the doom and gloom' in their interpretation of the nation´s history" (Symcox 2009, 37).

Symcox refers, in her argument for teaching based on human rights and social justice, to philosopher Martha Nussbaum, and quotes her when she states that U.S. pupils should be told:

> "…that they are, above all, citizens of a world of human beings … The accident of where one is born is just that, an accident, any human being might have been born in any nation" (Symcox 2009, 44).

American historian Jonathan Hansen analyses different forms of cosmopolitanism and defines Nussbaum's perspective as "moral cosmopolitanism":

> "The cardinal tenant of moral cosmopolitanism is that human beings are worthy of equal treatment irrespective of the accidents of birth—race, gender, status, citizenship. … As philosopher Martha Nuss-baum has put it, moral cosmopolitans act not out of love for country and cultural group but out of commitment to Right" (Hansen 2012, 19).

According to Symcox, opponents to the cosmopolitan trend include conservative researchers and authors, such as Bloom, Hirsch, and Schlesinger, who stand for an increasingly obsolete nationalism:

> "…uplifting patriotic narrative, tracing the rise of American nation-state to world supremacy and serving a vital function as the cultural glue that holds the nation together. But I would argue that this nationalistic way of thinking is increasingly *out-of-date* in today´s globalizing world" (My italics; Symcox 2009, 40).

A nationalist goal

The third goal in the field is often attributed to absent actors, making frequent use of a nationalist adversary that lacks explicit proponents at the conferences and among the anthology writers. A shared feature is that the adverse ideas are seen as connected to what Carreto et al. call "the romantic approach of the mid-nineteenth century" which "…promotes national identity and social cohesion within a world that is organized into nation-states" (2010, 4)—a position which is said to rest on mistaken premises. One assumption of this critique is that the world is post-national; another is the claim that the nationalist argument, that national history contributes to national cohesion, is an illusion:

> "The prescription of national "canons" is not a solution to any educational problem (even if it may *falsely* appear to solve a political one)" (Ashby et al. 2009, x);

Symcox and Wilshut have a special section in their book with articles on the theme of "New Curricula in a Post-National World", and in Carretero et al. (2012) there are various articles with the ambition to denationalize history.

German history education scholar Stefan Berger remarks that the cosmopolitan critique of strong national narratives builds on the idea that these narratives

> "…*ultimately* feed xenophobia and intolerance and have been historically responsible for violence, war, ethnic cleansing and genocide" (My italics; 2009, 35).

Despite the fact that different writers within these anthologies use varying terms and persons in their descriptions of the opposition, there is a recurring argument that there is no qualitative difference between nationalist arguments and other forms of claiming national interests. It is not tenable, Berger observes, to distinguish between "good and bad patriotism":

> "…the voluminous scholarship on nationalism has established (beyond reasonable doubt) that any kind of collective national identity vitally depends on the conception of others who do not belong to the nation. It is near-impossible not to construct a positive view of self without at the same time building a negative view of others" (2012, 35).

The degree of xenophobia and intolerance has varied historically, Berger claims, but:

> "Patriotism and nationalism blend into one another precisely because they share construction features such as the search for enemies and 'others'" (2012, 35).

The consequence is that the arguments which writers labeled as "liberal nationalists" (Berger 2012, 34) have put forth will not be accepted, and that the list of adversaries placed in the nationalist enemy position will be very extensive.

The conflict between professional history education scholars and politicians, as referred to initially, recurs in several texts, wherein the positions and actions of politicians are characterized as unacceptable. While several debaters point to specific politicians and other right-wing commentators as their adversaries, Lee views politicians generally as his counterpart in the debate:

> "All this has taken us some distance from the politicians' reason for worrying about history…" (2010, xiii).

> "Someone who sees the world historically has an apparatus for thinking about claims on the past made by politicians and priests (and even economists and bankers)" (2010).

> "Politicians and bureaucrats—and probably much of the lay public if they ever give it a thought—tend to views history education as justifying itself by providing a sort of social cement" (2010, xi).

The view that politicians are not legitimate actors on issues relating to history education is, however, shared by other gatekeepers. Grever writes: "… several governments *interfere* with historical culture" (My italics; 2012, 76), while Taylor and Guyver see the alternative to the academic-based perspective on history teaching as an "…assault on the disciplinary integrity of history" (2012, xii). Taylor calls a conservative government's curriculum proposal an attempt to "…hijack the school history agenda" (2012, xii).

Problematizing the extreme positions of the debate

It is not only the nationalist camp that gets subjected to criticism, and defined as extreme, within these anthologies, but also of the remaining two positions. Keith Barton and Peter Stearns belong to the critics.

Barton has a chapter in History War in which he attacks the very use of the concept "history war" (2012). Barton argues that the liberal (in the U.S. sense) debaters, who introduced the term, are doing themselves and their endeavors, for a more liberal history education, a disservice. He points out that the war metaphor works against the chance to develop history education in a constructive way. A war, he says, can possibly exist at a rhetorical level between certain groups partaking in the public debate. The debaters in this "war" are primarily speaking to their adherents, with the aim of creating a common enemy.

The teachers who carry out history teaching are more or less unaffected by this polemic. U.S. teachers are only partly governed by curricula, and hardly at all by guidelines formulated at a national level, Barton claims (2012). Curricula are approved by the states, but formal control is not very rigid. However, teachers can encounter opposition from parents and the general public if they teach in a way that is offensive to the local community:

> "Most teachers will teach what has been always been taught, those who wish to include alternative examples and perspectives will still be free to do so, limited only by local opinion and not by state guidelines" (Barton 2012, 196).

Teachers know and find it reasonable, in Barton's opinion, that different goals must be combined in teaching, not isolated and placed in opposition to each other:

> "The metaphor of warfare suggests that these goals are held by competing groups or individuals … yet most teachers—and probably most members of the public, hold some of these goals simultaneously, and when such purposes come into conflict it is not easy to decide how to proceed" (Barton 2012, 197).

Barton thinks that research should address the important task of supporting teachers in their efforts to combine different goals instead of seeing them as incompatible:

> "In order to improve history education both the profession and the wider public need to consider more carefully how competing purposes can be combined, prioritized or reconciled" (Barton 2012, 198).

There are instances of Swedish research that support Barton's perspective. Ingrid Mossberg Schüllerqvist (2008) demonstrates in her doctoral thesis that school teachers of Swedish literature do not assume isolated positions in the public debate but combine external goals and internal goals (a practice she terms "combination strategy"). Anna Karlefjärd adds, in her licentiate thesis, a more general argument supported by the political scientist Lipsky: teachers, like most other professional categories defined as "street-level bureaucrats," constantly combine seemingly incompatible expectations placed on their practice (Karlefjärd 2011; Lipsky 1980).

In the long run, a polarized debate will undermine the teachers' ability to combine different types of goals for their teaching, as Barton claims:

> "If exposed to hostile and dualistic perspectives long enough, educators may begin to think of these as the only viable alternatives" (Barton 2012, 118–89).
> /…/

> "However the hyperbolic language of conflict itself may damage the quality of history education because it may constrain what we think about the subject's nature and purposes. In trying to address the inadequacies of history education, that is, teachers, historians or other citizens may be tempted to embrace the dichotomies and exaggerations found in the metaphors of warfare. The field would be better served by more thoughtful and open-minded collaboration and deliberation" (Barton 2012, 199).

An important premise of Barton's argumentation is his conception of history education as strongly tied to national contexts. This makes it hard to compare countries meaningfully:

> "History education is so culturally, politically, and ideologically charged that it cannot easily be separated from wider social forces" (Barton 2012, 188).

Peter Stearns also discusses the conditions of U.S. history education and assumes, like Barton, that the values presented in the debate as mutually exclusive must be combined by teachers. To him it is unthinkable that the survey course provided with small variations in U.S. schools, "the American survey", should be abolished in favor of a cosmopolitan teaching:

> "There is no way, in the foreseeable future, that either the American public, or relevant educational officials are going to be prepared to accept a wholesale revision of the canon of United States history. American politicians, at federal and state level alike ... are committed to the perpetuation of the American survey" (Stearns 2007, 160).

Stearns remarks that there is a prevailing view, which he shares to a certain extent, that the survey courses have contributed to national cohesion, not least through integrating immigrants into a citizenship conversation:

> "Whether the survey really brought diverse ethnic groups into a common intellectual and political framework—and I think it did in part—educational leaders believe and continue to believe that it served that purpose" (2007, 162).

When Stearns argues for a gradual internationalization of the teaching perspectives on U.S. history as a more realistic strategy, he does so on the basis of the assessment that it is reasonable to highlight national features in history education:

> "The idea of the nation as … having to a great extent been constructed (and having potential similarities to the construction of other national identities and partly imagined traditions) need not counter an ultimately exceptionalist emphasis" (2007, 166–67).

Stearns sees the break with England and the emergence of the USA as a separate nation as a feasible basis for the focus on the uniqueness of the nation's history and a legitimate basis for a national identity construction, similar to its current status as "the sole remaining superpower. In other words, the parameters of exceptionalism need not be constant for all time" (Stearns 2007, 167).

Stearns focuses on an important aspect of a national history education: its changing character over time. He argues that a gradual reinforcement of the international perspective within the American survey course would make the course more relevant from a national American perspective in a time when the USA no longer exists in "splendid isolation":

> "The hope is, however, that a continued commitment to the fact of a national survey and the growing awareness that national self-interest requires greater global understanding can clear the way for some serious reconsideration of current canonical staples … internationalization of the US survey also serves a broader purpose of citizenship" (2007, 171).

Stearn thinks that what is seen as constituting a national interest should serve as a selection criterion for the content of history teaching, and that the understanding of what such an interest is changes over time. Like Barton, he argues for a compromise strategy, because all actors have different views on what is in the best interest of the nation and forms the basis of responsible citizenship:

> "Internationalizing the US survey is in one sense a compromise strategy for it continues to grant more salience to the nation as a unit than it may deserve. …It will require no small effort to persuade many American history teachers and the educational officials and public to … broaden the course as suggested in this chapter. … internationalization of the US survey course also serves a broader purpose of citizenship. One of the justifications for the survey course in the first place has always rested with citizenship: the legitimate need to teach students the history of the institutions in which they can participate in the exercise of responsible democracy… responsible citizenship also involves active awareness of the nation´s global impact. …a new kind of ideal student… capable of identifying the nation within a global context" (Stearns 2007, 171–72).

The concept of nation in the fields of history and political science

The concepts of "nation" and "nationalism" emerge as central to the understanding of the field of "History Education". There is an interesting difference between how historians and political scientists treat these concepts. A survey of how historians write on the issues of nation and nationalism in *The SAGE Handbook of Nations and Nationalism* emphasizes three main types of research perspectives:

1. A group of 19th century historians played an active role in establishing and developing the concept of nation, and nationalism as an ideology in the 19th century.

2. A group of historians profiled themselves as critics of nationalism in the postwar period. Myths of the ancient roots of the nation were disclosed as empirically unfounded. The focus is on periods of nation-building. Nationalism was seen as 'constructed' and as a form of 'false consciousness' in Marxist terms.

3. A third group of historians narrate the evolution of the concept of nation. Among those there are two clear movements: Those who locate the emergence of nations late in history and as part of a political program, and those who locate the emergence of nations early in history, in Medieval or Early Modern Times, and in some cases even earlier (Kumar 2006, 15).

It is hardly surprising that historians are concerned with historical perspectives. However, a problem might arise when history education scholars view all arguments regarding presentday nations through a lens that focuses on the early periods of nationbuilding, the mythical origins of nations, and the atrocities committed by nationalists.

In the scholarly discussions among political scientists, there is a further focus: the changeability of nation and the idea of continuous nation building (Lödén 2011; Chafetz et al., eds. 1999). There is a prevailing view that national identity is subject to constant creation and recreation, which can take many forms with varying content. Such a view makes it reasonable to see political disagreements, even within democracies, largely as a struggle for the right to decide what is in the "nation's interests" and what can serve as content for national identity building (Chafetz et al., eds. 1999, viii-xxii). The editors of the handbook *The Origin of National Interests* thus argue that whether national identities are

unnatural or artificial is academically irrelevant "because all political communities, whether natural or invented, have political consequences" (Chafetz et al., eds.1999, x-xi).

If we choose to keep the term nationalism for all forms of ideologies linked to nations, as some political scientists do, the result is a quite varied set of conceptions. Swedish conceptions of neutrality, foreign aid programs to nations in need, the concept of the 'folk home', and the welfare state constitute central parts of Swedish nationalism. Such a perspective makes it not only hard, but also impossible for politicians *not* to pursue some variety of "nationalist" politics.

Thomas Nygren shows in his doctoral thesis that history education within Sweden during the postwar period (with the 1950s as a historic turning-point) has evolved from a classical nationalist focus on kings as military heroes to an emphasis on international history (Nygren 2011). Nygren highlights several different agents of change. In some periods, there have been international organizations influencing Swedish politicians and curricula developers, using the Nazi conception of history as a cautionary example. Nygren, however, finds that the Swedish teachers themselves—not least their students—have also been agents of change. The students' choice of subject-matter for their examination essays clearly points to a significant change in Swedish young adults' interest in history, where modern international history dominates and Dag Hammarsköld, Raoul Wallenberg, Martin Luther King, and Nelson Mandela are the new heroes. These choices indicate a change in Swedish history consciousness, where the international perspective and peace efforts play a significant part. Such a view is also an important part of the image of the nation, i.e. the kind of nationalism that Swedish politicians during the post-war period have communicated, internally, and externally.

Concluding remarks

The critical comments on the field of History Education in this chapter pertain to the arguments and the agenda that some of the gatekeepers of the field voice in their anthology contributions. The agenda places the response that I quoted initially—politicians are idiots—in a meaningful context. Influential actors in the debate describe politicians as illegitimate intruders in History Education scholars' domain. The response can be understood as coming from a context of more intense conflicts on history education than in Sweden.

Based on the gatekeepers' argumentation, a triangular field characterized by three corner positions has been drawn—a cosmopolitan, an objectivist, and

a nationalist position. These three extreme positions have been presented as problematic. The problem involves, to a great extent, the understanding of phenomena such as nation and nationalism. A cosmopolitan position presumes the disappearance of nations, which is a highly uncertain hypothesis. An objectivist position requires a teaching completely free of all political values, which must be regarded as unrealistic in a world of nations, governed by politicians. These two lines of argument are profiled in relation to a nationalist position, which lacks explicit proponents in the conference and anthology material studied.

As an alternative to the understanding of nationalism that focuses on the origin of nations and atrocities committed by nationalists, this chapter highlights the view that is gaining ground in political science. This perspective deals with how forms of nationalism are reproduced, but also how they are created anew in established and advanced democracies. Here, politicians are not seen as intruders but as legitimate actors in a complex process of deciding what kind of nation we should live in and what kind of past should be taught in schools.

Notes

[1] In this paper I use "History Education" when referring to a field of scholarly debate, and "history education" when referring to the everday meaning of school history.

[2] Bourdieu (1992), Broady (1990), Broady (1998). My discussion is inspired by the Bourdiean concepts of field and the writing of Donald Broady, who have lead a Swedish research group doing a number of field studies. My use in this paper of the concept of field is heuristic, as an attempt to structure the discourse of History Education according to two dominant hierarchies of values. I do not use other aspects of Bourdiean terminology and theory.

[3] Sam Wineburg leads a research group at Stanford in the United States, which uses the motto "Think like an historian". In his seminal book, Historical Thinking and other Unnatural Acts (2001), Wineburg focuses on historical source understanding.

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Part II:
Writing and Interaction

CHAPTER SIX

REVIEWING FINNISH STUDIES ON WRITING IN BASIC EDUCATION: TOWARDS A PEDAGOGY FOR DIVERSITY

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Introduction

Productive literacy skills of young students are becoming more and more important within pedagogical contexts as multifaceted writing itself becomes an increasingly everyday activity both in and out of schools. At present, literacies are more participatory, collaborative, and distributed than conventional literacies (Lankshear and Knobel 2007). Interestingly, the European Commission's indicators of school education quality state that reading is one of the most important factors, but make no mention of the productive skills (EC2000). In addition, international PISA-tests regularly reveal the functional reading skills of certain age groups comprising adolescents, but there is a lack of such tests for writing—perhaps due to the complexity of testing writing competence and the problem of culturally bound text genres.

It is well known that Finnish 15-year-olds have performed well in large international studies on reading (OECD 2004; 2010; 2014). In addition, younger fourth-grade Finnish students have shown good reading skills in the Progress in International Reading Literacy Study (PIRLS) (Kupari et al. 2012). In contrast with such studies, national Finnish assessments of young students have shown weakening competencies in producing texts (Lappalainen 2008; 2011), or the competences have proved to be heterogeneous (Harjunen and Rautopuro 2015). Based on these arguments, there is a need for a systematic review of writing studies in order to develop a research-based writing pedagogy.

The importance of gaining an overall picture of current writing studies is even greater in the context of the digital age, which has led to a proliferation in the ways in which we write. Writing has become a 21st century skill that is essential for coping with the various virtual environments and meaning-making strategies, and which are required in the composition of multimodal texts (e.g. Kress 2003). In fact, written modes of meaning-making can be complemented or even replaced by other methods such as visual or oral modes of text production (Kalantzis and Cope 2012).

In addition to the multimodality of texts, another multifaceted aspect is the diversity of the various methods of meaning-making within different cultural, social, or domain-making contexts. According to Kalantzis and Cope (2012), texts vary enormously depending on social context; variance factors include the writer's life experience, subject matter, disciplinary domain, cultural settings, and gender identity; in other words, we use communication to move between different social spaces with different social languages. As stated by the New London Group (1996), the scope of literacy pedagogy should account for the differences between culturally and linguistically diverse, but increasingly globalised, societies. In fact, according to Kalantzis and Cope (2012), negotiating these social language differences and their patterns has become crucial in literacy learning. The two multidimensional perspectives are not separate, as social diversity in literacy is closely related to multimodality—the proliferation of communications channels and media supports and extends cultural and subcultural diversity (New London Group 1996).

In literacy studies, diversity is seen as multilingualism in education (e.g. Lotherington et al. 2008; Lotherington 2007), and as cultural and linguistic diversity (e.g. Mills 2006; 2007a). This diversity matters, as Mills (2007b) has shown that culturally and linguistically diverse groups may have different kinds of access to multiliteracy. In addition, social diversity can refer to different types of learners (e.g. Ikpeze 2012). In this study, we distinguish three dimensions of diversity, namely linguistic, cultural, and social. In some cases these perspectives can intertwine, for example, language is deeply embedded in culture. On the other hand, cultural diversity could be described as being more contextual in nature as it includes the ways one interacts with an environment (Kerwin 2010). And social diversity is related to gender as well as other kinds of social backgrounds.

There have been a few systematic reviews on writing in this century so far, however they seem to represent the pedagogical contexts of English-dominated countries; Juzwik et al. (2006) concentrated on writing research in a particular period, Graham et al. (2012) reviewed writing instruction in elementary schools, and Stagg Peterson (2012) conducted an analysis of discourses on writing and writing instruction in curricula across Canada. If considered in the light of diversity, Juzwik et al. (2006) drew the conclusion that social context and writing practices, as well as bi- or multilingualism and writing, were among the most actively studied themes in their study—while literacy modalities, for example, received less attention.

Due to the strong shifts in textual practices, the concept of multi-literacy has been heavily integrated into the Finnish core curriculum for Basic Education of this century (2004; 2014). Overall, the focus has moved from individuals' skills to general literacy practices in communities and networks, and from the restricted and gradually developing skill of reading and writing to multiple literacies. The current trends in literacy pedagogy highlight the variety in semiotic resources and practices in producing texts, tools for planning, producing and evaluating multimodal texts, and the reading and writing processes of various communities (Finnish Core Curriculum for Basic Education 2014). This pedagogical emphasis not only requires the reconsideration and remodeling of the current methods of teaching writing in schools, it also challenges the objectives and practices of literacy research (cf. Holm and Pitkänen-Huhta 2012). There is a clear need for research-based knowledge on how to support writers' various competencies within changing environments and writing tasks. Beyond this, there is also a need to encourage students to use their many linguistic resources when producing texts.

In order to study this turning point of multiliteracy in text production and its visibility in Finnish writing research and in an effort to achieve a more general view of Finnish writing studies, this chapter presents a systematic analysis of writing skills, and the pedagogy of writing, in Finland. The aim of our review was to explore the nature and quantity of research into these matters in Finland in the 21st century. More specifically, we look to determine the age groups that are most prominent in the studies, the type of data used, and the areas covered. In an earlier article (Kauppinen et al. 2015) discussing the present data, we analysed the results in Finnish, looking at the National Core Curriculum. In this study, we aimed to broaden our perspective to take in multifaceted aspects within a multiliteral framework by identifying aspects of diversity in the data.

Methods

The first phase of our data collection included defining key-words in English and Finnish (e.g. writ*, writing, literacy, spelling in combination with, e.g. learning, pedagogy, teaching, Finn*). We limited our search to peer-reviewed studies, including journal articles, dissertations, and licentiate theses, published after the year 2000 (until 2014). We concentrated on studies that focused on basic education (grades 1–9), including pre-school. Beyond these academic studies, we also included national evaluation reports of learning outcomes in mother tongue and literature, as they likewise adhere to scientific criteria in terms of sample size and analysis. The search was updated—after initial publishing of results (Kauppinen et al. 2015)—to include studies published by August 2015. The data

was retrieved using major search engines in the field of education, linguistics, psychology, humanities, and the social sciences as follows: Primo Central Index (PCI) covering ERIC, LLBA, Project Muse and Psycinfo. In addition, we used Scopus, Web of Science Arts and Humanities -index, and the Finnish search engines Arto and Melinda. Despite careful cross-checking using different search engines, it is possible that we did not locate all the studies fulfilling our criteria.

The second phase of data retrieval included careful identification of the studies by checking the topics, tables of contents, and abstracts. We excluded studies with Finnish as a second language as well as Swedish, Sami, Romani, or Sign Language as a mother tongue as their aims and contents in terms of language as a curriculum subject differ from those written with Finnish as a mother tongue. We also excluded studies concerning writing in high school because of the recent extensive study by Kauppinen et al. (2011) on that theme. Studies that fell in a "grey area" (cf. Harden and Thomas 2010, 754–755) were discussed and carefully considered—for example, psychological studies on dyslexia, which often focus on reading rather than writing. Those studies on dyslexia which included "spelling" in the keywords or abstract were included in the data (e.g. Torppa et al. 2011). The final data consists of 61 refereed articles, 3 licentiate theses, 9 monographic dissertations, and 11 national surveys, making a total of 84 studies (a full list of the data and keywords is provided in Kirke 2015).

In the analysis, we followed the principles of qualitative content analysis. We first coded the analyses of population age groups, methodology, data, theme areas, and main results into tables. We aimed to rely on the authors' own terms and formulations. This proved challenging, however, especially in the analysis of methodology, due to the different scientific fields the studies represented; we resolved this by categorising the studies into quantitative, qualitative, or both. After sorting the data into tables, we integrated the results regarding the various topics as transparently as possible, by making summaries on a more abstract level (cf. Harden and Thomas 2010). After formulating tables and figures to illustrate the results, we combed through the coding to identify signs of social diversity. Before the analysis, we outlined three main perspectives of diversity: social, cultural, and linguistic. We started the analysis from the main research questions and results, and from there exhaustively noted and interpreted all the signs that we believe shed light on the question of diversity in writing studies. In addition, the data and the common research frame were carefully considered from the perspective of diversity. Finally, we looked more closely at those studies which had the potential to increase our knowledge on this issue.

Investigator triangulation was used to ensure reliability (cf. Flick 2006). All six authors worked together during the entire process, from data identification to interpretation of the results. All are experts in the areas of writing and writing pedagogy, as all teach and study themes related to writing. This meant that it was important to deconstruct our various assumptions regarding writing, in order to reach a common understanding.

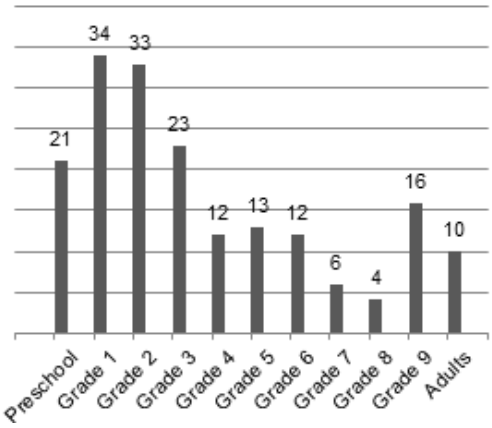
In the following sections, we will first give a short overview of the age groups, data, and methods in the Finnish writing studies examined, before proceeding to an analysis of the theme areas and a discussion of the diversity in the data.

Results

Age groups, data, and methods

The age groups investigated in the studies were classified based on school grade-level, as is typical for studies of school children. If the data was collected from several age cohorts, as is often the case in longitudinal studies, all data sets were marked in Figure 6-1. The results show that current Finnish writing research concentrates on younger children, from preschool to the 1st and 2nd grades of elementary school (Figure 6-1). The 4th to 9th grades were less studied; studies of these class groups mainly consisted of national evaluations of learning outcomes after the 6th and 9th grades. Additionally, in four studies, junior high school students were not the main age group; instead, they were part of a longitudinal study or served as a control group for younger students. "Adults" in Figure 6-1 refers to data collected from parents and teachers; however, this was a rare event. It should be noted that Kettunen's (2005) study is excluded from Figure 6-1 as it concerned 7–10 year old children in a special education class.

Figure 6-1. Age groups in Finnish writing studies (N=83). (Modified from Kauppinen et al. 2015)



The most common types of data collected included spelling (N=40) and stories (N=14). Spelling is a typical way to measure early writing skills, especially in the psychological field (e.g. Leppänen et al. 2006), while the story is a traditional text genre in school pedagogy in Finland (e.g. Pajunen 2012). There were a few studies that used written essays or questionnaires; however, several types of data were only used in individual studies, e.g. written feedback or textbooks.

Methodologically, there was an emphasis on quantitative studies (N=43) over qualitative studies (N=26) and studies using both research strategies (N=15). Similar to the use of data, methodology is connected to the fields of research. Most of the quantitative studies were psychological follow-ups from preschool to first grades at school (e.g. Mäki et al. 2001). In this kind of study, writing was usually examined in relation to other variables such as phonological awareness and naming ability (e.g. Torppa et al. 2013).

The qualitative studies assessed were more sporadic, and were mostly analyses of students' texts (e.g. Kauppinen 2008). A few concerned writing pedagogy, e.g. the writing process (Murtorinne 2005). Some studies based their quantitative analysis on qualitative grounds (e.g. Kulju and Mäkinen 2009), or made qualitative estimations of numeric data (Luukka et al. 2008).

Theme areas

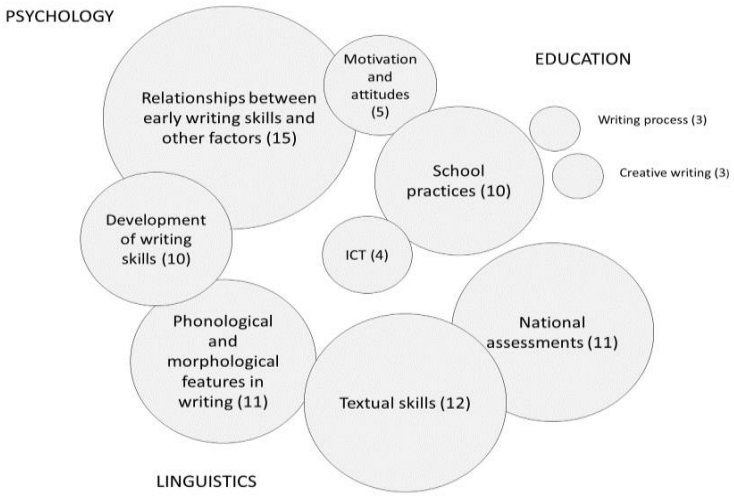
The analysis of the age groups, data, and methods had already anchored the studies within different scientific fields and, as seen in the following illustration (Figure 6-2), the analysis of data theme categories confirmed the grouping of the studies into psychological, linguistic, and educational fields. Although some of the theme areas overlapped regarding, e.g. the relationship between motivation, attitudes, and writing, these main scientific fields characterise the studies in the present data.

Psychological studies seem to focus on the relationship between writing and reading, or other factors such as rapid naming, phonological awareness, or the development of writing skills. Writing itself is seldom the focus, and it is mainly seen as a spelling skill that is easy to quantify based on writing errors. This trend explains the large number of quantitative studies in the data and the emphasis on the youngest age groups and spelling.

The problem categories within the linguistic fields are mainly related to phonological features in writing, or textual skills such as genre features in students' texts. These studies represent a school pedagogy, which is characterised by attempts to develop students' writing skills through teachers' feedback. In this sense, the textual features of students' writings serve as indicators of their writing skills (Kauppinen and Hankala 2013). Despite this, the selection of text genres is quite limited in these studies.

The problem categories within the educational field are centered around school practices (e.g. Nurmilaakso 2006)—a particularly weak and scattered field—where the general aim seems to be the development of tools for writing pedagogy, for example by exploring the writing process (e.g. Murtorinne 2005). There are only a few studies concerning writing pedagogy in the light of digital literacy, for example the impact of computer-based intervention (e.g. Saine et al. 2011). One of the rare studies that concerns modern technology in writing studies is the work by Kanala, Nousiainen and Kankaanranta (2013) on the use of mobile applications.

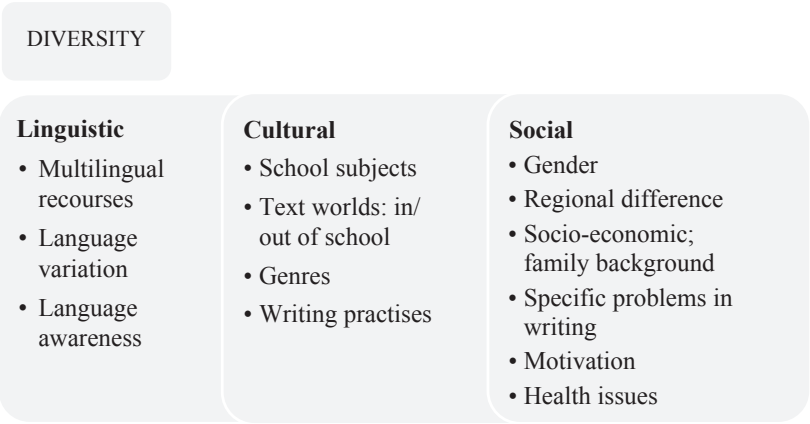
Figure 6-2. Theme areas of Finnish writing studies (N=84) (Modified from Kauppinen et al. 2015)



Diversity in writing studies

Despite the fact that diversity was not a focus in any of the studies, we aimed to use it to interpret the data. There were various manifestations of diversity within the studies, due to the multi-layered nature of the concept. Therefore, it was required to consider the aims of the studies, research questions, data or data collection, as well as the main findings. Figure 6-3 illustrates the aspects of diversity found in the present data. This data falls into three main categories: linguistic, cultural, and social diversity. It is to be noted that some of the signs of diversity were weak in the data; that is, the category is based on only a few studies. Nevertheless, we attempted to draw an overall picture in order to envision the possible future aspects of diversity in writing research. The categories also overlap as, for example, the use of language is intrinsically linked to cultural aspects.

Figure 6-3. Traces of diversity in Finnish writing studies of the 21st century



Linguistic diversity concerning studies on writing. Linguistic diversity is examined via several routes in the research on writing. There were some studies in which multilingual resources were used by pupils in text production. For example, Elomaa (2000) studied the effects of a Swedish language immersion on the writing of Finnish pupils. In a few studies, pupils' many linguistic resources were also examined from the perspective of language variation (e.g. Halonen 2009). The case of linguistic continuum, that is, when pupils move from oral to written text production, was investigated in the study of Poskiparta et al. (2003). There were also research frames that contained many kinds of language variation concerning classroom practices in literacy instruction, according to both teachers and students (e.g. Luukka et al. 2008). However, there were only a few studies in which standard language was enhanced to encompass many varieties of language when producing texts.

In addition to studies on multilinguality and linguistic variation, there were a number of comparable studies of writing between language groups, including linguistic diversity. Georgiou et al. (2012) explored different orthographies (Finnish, Greece, English) and their effect on the early stages of writing. Lingual comparison was also included in the research frame of a study in which Finnish and English children's style and register in text messages was investigated (Plester et al. 2011)—in this same research we could also see an added dimension of linguistic diversity, namely language awareness. The aim of these types of studies is to promote pupils' multiple linguistic resources for text production and to enhance their metalinguistic sensitivity.

Cultural diversity concerning studies on writing. Writing literacy practices can be accessed for all kinds of learners through the choice of a learning culture. Studies relating to these issues can be divided into the following categories: writing as part of academic skills in different school subjects, text worlds in and out of school, and classroom writing practices.

The multimodal representations of different school subjects have been explored in a couple of studies, and this kind of interdisciplinary orientation to writing is clearly a new development in Finnish writing research. Examples of this phenomenon include the studies of philosophical essays and their argumentation as a writing skill by Sääskilahti (2008), and text production in mathematics instruction by Joutsenlahti, Kulju, and Tuomi (2012).

With the exception of the investigation of writing as classroom practice, writing was studied in terms of different textual environments, such as hospitals and schools (Suvilehto 2003; Suvilehto 2008) and in club activities (Korkeamäki and Goman 2012). Writing research in these environments can be connected to a new concept of writing in which it is seen as a social, creative practice in local contexts where the formal and informal learning environments merge (Mertala 2015). Gee (2008) refers to secondary discourses, which are language patterns into which pupils are socialised outside the home, for example in school or clubs. Gaining an awareness of these secondary discourses is vital for the development of writing instruction (cf. Mills 2010).

In addition, the studies on writing that use digital tools and e-environments demonstrate how traditional methods can be rejuvenated by breaking down the barriers of formal learning environments. For example, Kumpulainen, Mikkola and Jaatinen (2014) focused on the social and blended practices of students who created a school musical script on laptops. Besides bridging the gaps between different learning environments, writing research has identified the potential to enlarge the scale of produced text genres. In addition to narrative texts, pupils have produced reviews (Kauppinen 2008) and arguments (Sääskilahti 2008) among other writing projects.

In short, through the choices of text worlds and writing practices as a part of the research frame, it should be possible to further study the writing capacity of those pupils who do not benefit from traditional writing literacy instruction.

Social diversity concerning studies of writing. Some aspects of social diversity within the data were clear, as they represent traditional categories of writing studies. One such category is gender, which frequently appears in national reports (e.g. Lappalainen 2008; 2011; Harjunen and Rautopuro 2015). As a part of this diversity, gender is seen to play a factor in the various skill levels of both girls and boys (e.g. Pajunen 2012), for instance, Routarinne and Abetz (2013) and Merisuo-Storm (2006) relate gender to attitudes, as girls seem to be more likely to report that they like school and enjoy writing. Gender differences may have long-lasting effects. For example, the effect of reading and spelling skills on secondary education choice was much stronger for boys (Savolainen et al. 2008).

Apart from gender, family background and socio-economic status are other forms of diversity which have long been taken into account as research variables in writing studies, especially in the psychological field. One example might be the educational level of mothers (e.g. Leppänen et al. 2006) or parenting styles (Kiuru et al. 2012, cf. Lerkkanen et al. 2010). These types of factors, as well as the socio-economic status of families, appear to be related to self-efficacy among other issues (Routarinne and Absetz 2013).

One trace in the data regarded specific reading and writing problems: We have interpreted that dyslexia could be a form of social diversity as it may play a role in forming groups, especially within the school context. For example, children with dyslexia could be less motivated than others (Lerkkanen et al. 2010). Writing studies in special education classes present another aspect of social diversity that has to do with learning difficulties (Kettunen 2005). It is also clear that health issues can play a role in diversity (cf. hospital schools in Suvilehto 2003; 2008). In conclusion, gender, family background, and reading and writing problems may impact social diversity, including varying levels of motivation to learn to write.

Discussion

In this chapter, we explored the latest writing studies using systematic review methods to form an overall picture of the current state of writing literacy research. To summarise, the main thrust of recent studies have focused on developmental issues in early literacy or individual students' skills with printed texts. Greater attention should be paid to other age groups, for instance, from the 4th to 9th grade, as writing skills are connected to choices made after basic education (Savolainen et al. 2008). There is also a call for concern about the limited selection of data. For example, interviews, textbooks, observations, writers' diaries,

and video recordings were seldom, if at all, used, even though these kinds of data could offer more profound insights into writing processes (cf. Kauppinen et al. 2015.) Most studies' theme areas were related to spelling skills in connection with other factors, or to linguistic features of produced text. There are surprisingly few studies on writing situations, or on the processes or creative sides of writing (cf. Juzwik et al. 2006). In the future, therefore, the scale of communicative acts, such as instructing, arguing, or affecting in authentic situations should be taken into account in text composition.

The writing studies are scattered into the research fields of psychology, linguistics, and education. This leads to challenges when trying to systematically develop a researchbased pedagogy of writing literacy. In the future, the range of studies could be more versatile in considering other academic fields and methods. For example, long-term projects that combine knowledge of developmental psychology, linguistic understanding of texts, and educational objectives would cover the complexity of writing skills and pedagogy in a more holistic manner. In addition to this, the features of situated writing practices (e.g. in transdisciplinary instruction) could be merged by means of design research and interventions.

By exploring the age groups, data, methodology, and themes, we were able to identify areas that require further research. As things stand, the studies analysed provide only limited guidelines for a development of a writing pedagogy in the scope of diversity in multiliteracy. Multiliteracy is often understood as the use of various genres, including those that differ from traditional written genres such as spoken, visual, or auditive. In this chapter, we attempted to recognize signs of diversity that more widely relate to text production, as originally construed by New London Groups (1996).

As pointed out by Kalantzis and Cope (2012), variations of language should be taken into account more often. Instead of studying writing from the separate viewpoints of the mother tongue, F2, or other languages, a multilingual aspect of language use and text production could prove fruitful. The study of pupils' multicultural capital and multilingual resources in the production of texts would yield a wider perspective, which would also help to define writing skills (from the perspective of equality). In this way, pupils' multiple voices could also be heard in formal learning settings.

An aspect which almost seems to be entirely missing from the data is the multiplicity of discourses in writing classes (cf. Gee 2008; Mills 2010). Future writing studies should shift from textual productions to discourses in writing

activities both in and out of school. This may even reveal reasons for the declining writing skills of boys in particular, and, in addition, this type of research would shed light on motivational acts, as one aim would be to get all students interested in developing their literacy skills.

From a cultural perspective, there should be more writing studies relating to the instruction of different school subjects. Traditionally, writing and texts are connected purely to Finnish language and literature, but in a multiliteral framework this should be broadened not only to all school subjects but also to text genres outside school in order to attain a more versatile perspective of social diversity.

A multidisciplinary field that enables researchers to study writing from their own interests could be seen as a strength in exploring the social aspect of multiliteracy. For instance, the highly discussed psychological field could serve to highlight the social aspect of diversity, with one such example being the effects of family background and motivation, which should receive greater attention when developing research on the school pedagogy of writing. Moreover, aspects of diversity overlap: the example above would also help from a linguistic point of view. In fact, from a social perspective, methodological choices for background variables may also reveal cultural aspects. For example, gender differences and differing types of cultural textual practices among boys and girls seem to share some relationship.

To sum up, by taking into account the gaps in the current research and by connecting it to the orientations of linguistic, cultural and social diversity, we may be able to develop pedagogically inspiring studies. Diversity intertwines in many ways within writing literacy research. The concept itself is complex, creating challenges for categorisation. In the future, in order to get a more complete overall picture of Finnish writing studies, the data for systematic analysis should be broadened to include studies focusing on Finnish as a second language and Swedish-speaking students. That being said, this paper is the first contemporary Finnish study to highlight the current trends in writing studies and offer some guidelines for future research.

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CHAPTER SEVEN

STUDYING THE USE OF TEXTBOOK IN THE ACTIVITY OF RECAPPING IN CLASSROOM DISCOURSE

Liisa Tainio

Aims of the paper

Researchers of education have long been interested in the interrelation between classroom discourse and learning. In reference to Bakhtin's idea of dialogic and monologic discourse (1984), most effective practices have been identified and suggested for the benefit of, for example, literacy learning (Nystrand 2006). In literacy education, the use of texts is the core of teaching and learning. However, even if the use of instructional texts has been seen as a highly important resource (e.g. Stodolsky 1989; Remillard 2005), there is surprisingly little research on how texts, and particularly textbooks, which have been recurrently shown to be the main instructional resource for teachers (Blumberg 2007; Norris et al. 1996; Tainio, Karvonen and Routarinne 2015), are used in different types of classroom discourse and how the texts influence the interaction and participation within classrooms.

In this chapter, I will analyze the role of textbooks in classroom interaction in Finnish mother tongue grammar education. In Finland, textbooks for basic education are written by several professional experts on subject knowledge and pedagogy, including teachers and researchers, and textbooks are usually seen as pedagogical tools of high quality (Tainio and Karvonen 2015). First, I will explore in detail interaction of recapping learned material within two classrooms in order to identify practices and sequential consequences of the use of a textbook as a material and cognitive artifact. By material artifact I refer to the textbook as an object that is oriented to, for example, by handling it and gazing at it; by cognitive artifact I refer to its immaterial characteristics used in shaping the creation of knowledge and discussion around the content and design of the texts in the textbook (Hutchby 2001; Nevile et al. 2014). After comparing these episodes, I will also analyze the views of teachers and pupils from these classrooms in order to find the interrelations between the participant views and the use of the textbook. I will conclude by discussing, first, the methodological benefits of taking the uses of textbooks or other instructional texts as a starting point for the analysis of interaction and participation, and second, by suggesting practices to achieve more dialogically organized discourse in classrooms during activities where instructional texts play a significant role.

Introduction

According to Bakhtin, monologic discourse is represented most clearly in the interaction between a teacher and a pupil where "someone who knows and possesses the truth instructs someone who is ignorant of it and in error" (Bakhtin 1984, 81). The main principle of dialogism vs. monologism has been interpreted by researchers of education as twofold: on the one hand, it refers to the understanding of 'truth', and on the other, to the organization of discourse—and the interrelation between these two aspects has been widely discussed (e.g. Scott, Mortimer and Aguiar 2006; Ford and Wargo 2012). In this chapter, the focus is on the analysis of the organization of discourse. Researchers of literacy have long been interested in the influence of dialogically organized discourse on student learning and motivation. For example, Skidmore (2000) and particularly Nystrand (2006) have emphasized the importance of dialogically organized discourse for the development of literacy skills. Nystrand argues that "classroom discourse shapes literacy skills due to the way it establishes classroom epistemology" (2006, 400). In his review article, Nystrand (2006) refers to a large body of research that demonstrates that dialogically organized classroom discourse greatly improves students' literacy skills. This is an interesting argument in reference to literacy classrooms where instructional texts are used as the source for learning scientific ideas developed in linguistics. At least in Finland, textbooks are virtually always used when the topic of the lesson is to study and learn about the grammar of the Finnish language (Tainio, Karvonen, and Routarinne 2015). In textbooks for primary education, the grammar of Finnish is presented according to the monologic understanding of linguistic 'truth', even if the 'truth' in academic linguistic discourses is, naturally, presented in more dialogic ways.

According to Nystrand (2006), effective classroom discourse for literacy learning includes several interactional practices that have also been suggested to represent practices of dialogic discourse. Among these, I have focused on four practices that were particularly salient in my data and at the same time were identified as fruitful for pinpointing the differences in the discourses of the two classrooms. First, one of the most effective practices mentioned by Nystrand (2006) includes uptakes and elaborations of student responses and initiatives. In many studies, it is suggested that student initiatives can constitute important opportunities for learning in the classroom (e.g. Waring 2011). Second, metatextual discourse, particularly references to the aim and the strategy of the pedagogic activity and to mutual learning history, are seen as significant for student learning (Grossman et al. 2014). Third, in this study, as a specification of metatextual discourse, teacher's instructions concerning the use of the text(book) is

considered important. Fourth, the use of authentic questions (Nystrand 2006), that is, avoiding questions-with-known answers (Macbeth 2004), in connection to discussion-based instruction with high academic demands is mentioned as influential pedagogy (e.g. Applebee et al. 2003). Nevertheless, many researchers emphasize the importance of flexibility—there should be differently organized discourses for different subject contents and episodes (Scott et al. 2006). The discourse is usually organized differently, for example, in episodes of introducing new knowledge, recapping the learned, or discussing student experiences, as well as during episodes of individual seat-work and group work. The idea of flexibility is also highly applicable to literacy education. Literacy education covers diverse topics, such as understanding literature, writing a text, and learning about grammar, which need different pedagogical approaches and discourses. Likewise, the textbooks, along with other texts, used for learning these subject areas are diverse.

So, in sum, even if the characteristics of classroom discourse in terms of learning have often been studied, the use of texts or textbooks has not been the main focus of these analyses. The importance of instructional texts for classroom teaching and learning has largely been recognized (e.g. Sosniak and Stodolsky 1993; Ball and Feiman-Nemser 1988; Remillard 2005), but the influence of texts on interactional patterns, participation, and student involvement are not fully understood (cf. Pitkänen-Huhta 2003, Tainio 2012a; Tanner 2014). There is still a need for studies that pay attention to the influence of textbooks (or other instructional texts) on classroom interaction since textbooks seem to remain in the core of education, including literacy education (Tainio, Karvonen, and Routarinne 2015).

Data and methods

My data consists of 38 video recorded lessons of mother tongue and literature education with the sixth grade (students' age c. 12 years), and includes interviews of teachers as well group interviews of pupils from these classrooms. The data was collected in 2004 and 2012, in the project TextMix (http://blogs.helsinki.fi/textmixblogi/). From this data set, I have focused on two lessons and interviews of the participants from these classrooms. I have chosen these classrooms and episodes for the analysis because they share many characteristics: Both teachers are experienced professionals, with several years of experience teaching this particular group of pupils; The classrooms have approximately the same number of pupils, boys and girls; The topic of the lessons is similar, namely, the grammar of Finnish; Finally, the classes are using the same textbook (*Kirjakuja*). The episodes that are analyzed are taken from a phase of pedagogic

interaction wherein the teacher recaps something that has been learned previously. The teacher asks, and the pupils answer. In these classrooms, the role of the textbook is prominent, though different.

The method employed is conversation analysis (e.g. Sidnell and Stivers 2013). Conversation analysis is a qualitative approach that analyzes naturally occurring interactions in order to examine the normative organization of ordinary conversational conduct (Schegloff 2006). Conversation analysis has gained growing interest in educational sciences as it is highly effective in revealing the orderly practices of interaction in different contexts, including learning situations (e.g. Seedhouse 2004; Tanner 2014). The use of material and cognitive artefacts, such as written texts, has been a focus of recent research, revealing the orderliness of these artefacts in the organization of actions tied to the management of talk and task activities (Nevile et al. 2014).

The interviews that are used as data consist of short interviews with teachers and group interviews with pupils from both classes. The teacher interviews lasted 11 (Park) and 13 (Shore) minutes; the group interviews, with four to five students, between 10 to 14 minutes. In the analysis of these interviews I have applied discourse analytic procedures (e.g. Fairclough 2003) in order to reveal the views of the participants concerning the textbooks used in the classes, as well as on the subject learned, and on participation and involvement in classroom discourse.

Results

The two episodes that I focus on are drawn from two schools which I have named as ‘Park’ and ‘Shore’. In both classrooms the topic is parts of speech; in Park the participants focus on one type, namely particles, in Shore the topic is to recapitulate all the categories of parts of speech. Both of the analyzed episodes are drawn from the period of pedagogic discussion, consisting mostly of teacher questions and pupil answers, and they occur in the early stages of the lesson. Tables 7–1 and 7–2 provide an overall picture of the two lessons and the activities that take place before and after the analyzed episodes. The main topics are marked in the table with (P) (particles) or (PS) (parts of speech). The numbers on the left refer to the flow of time.

Table 7-1. Overall description of Park lesson, focus on particles (P)

0–1.30	Instruction to a test (P)
1.30–6.30	Test on conjunctions (P)
6.30–10.10	Pedagogic discussion (P)
10.10–18.00	Instruction of group work; doing group work (P) (writing)
18.00–21.37	Checking group work together (P)
21.37–29.50	Working individually (P)
29.50–31.00	Assigning homework (P). End of lesson.

Table 7-2. Overall description of Shore lesson, focus on parts of speech (PS)

0–8.25	Joint discussion: planning the next music lesson together
8.25–11.00	Introduction to (PS)
11.00–26.55	Pedagogic discussion (PS)
26.55–28.50	Start of individual seatwork (PS)
28.50–31.30	T gives folders back; laughing together
31.30–35.40	Continuing individual seatwork (PS)
35.40–42.02	Checking the exercises; student questions (PS)
42.02–45.00	Assigning homework (PS). End of lesson.

As can be seen, the lesson at Park is focusing only on particles. After a written test on conjunctions (one category of particles), there is pedagogic discussion on particles. The pupils then write, as group work, an advertisement where they ought to use representatives of certain categories of particles. After that, these advertisements are read aloud. Then, some individual seatwork and the lesson ends. The lesson at Shore consists of various episodes of which some are not connected to the main topic, parts of speech. At first, there is joint discussion about the next music lesson: the teacher and the students plan the agenda together. Then there is an episode of pedagogic interaction about parts of speech, followed by individual seatwork on this topic. However, during pupils' seatwork, the teacher gives their folders back, along with some feedback on the texts that they include. The teacher and the pupils laugh together on the humorous aspects of these texts and feedback. After some more individual seatwork, the participants check the exercises together, and the lesson ends. At Shore, there are more self-initiated student questions than at Park—this is also marked in Table 7-2. The Shore lesson, and also the period of pedagogic discussion in it, is longer than at Park where the group work takes most of the lesson time.

In the analysis of the selected episodes, I will pay particular attention to those aspects highlighted in the introduction, namely, the metatextual instruction concerning the use the textbook, the uptakes and elaborations of pupil responses, references to mutual learning history and teaching/learning strategies, and the level of academic demands. I will start with the episode at Park (Example 7-1). In the transcriptions, the translations in English are in italics and shown under the original Finnish turns. Those turns that are direct quotations from the textbook, read aloud, are marked with citation marks. Otherwise, the transcription follows conversation analytic transcription conventions (see the Appendix).

At the beginning of the Park lesson, the teacher has given a test for students about particles: they have been asked to write down all the co-ordinating and subordinating conjunctions in Finnish. After the test, the teacher starts the pedagogic discussion by asking the same questions about conjunctions orally, then proceeds by asking about other categories of particles. The teacher has the textbook open on his desk.

Example 7-1.

01 Teacher: j[a; (.) khöm anteeks; (.) sitten mitäs olivatkaan nää (.)
a[nd; (.) khöm excuse me; (.) then what were the (.)
[((teacher looks at his textbook))
02 alistuskonjuktiot.
subordinating conjunctions.
03 (2.0) ((some pupils raise their hands, including Einari))
04 Teacher: Einari.
05 (.)
06 Einari: **että jotta koska kun kunnes jos vaikka kuin?**
that because when until if whether as?
07 (.)
08 Teacher: ky:llä.
yes.
09 (1.0)
10 Teacher: NO? (0.5) sitten. (.) vielä; (1.0) si[ellä.
WELL? (0.5) then (.) in addition; (1.0) t[here.
[((teacher looks at his textbook))
11 (1.0)
12 Teacher: yleisimmistä partikkeleista om myös kaks muuta ryhmää.
the most common particles form also two other groups.
13 (2.4)
14 Teacher: mitäs nämä kaks muuta [ryhmää on.
what are these two other[groups of particles.
[((Cecilia and some other students start to open their textbooks))
15 (6.0) ((some students raise their hands))
16 Teacher: Cecilia.
17 (.)
18 Cecilia: [**"a- adve:rbi:t [ja: inte:rje:k- (.) ti[ot**".=
[a- adve:rbs [and interject- (.) tio[ns.
[((Cecilia looks at teacher))[((looks at her book))
[((teacher looks at his book))=
19 Teacher: =[joo.
=[yea.
[[((teacher looks at his textbook))
20 (1.2)
21 Teacher: mi[täs? (1.2) adverbit oikeen, (.) ilmaisevat.
wh[at do the? (1.2) adverbs actually, (.) express.
[((teacher looks at the textbook))
22 (2.0) ((many students raise their hands and look at their textbooks))
23 Teacher: Joona.
24 (1.0)
25 Joona: [**"aikaa paikkaa tapaa**. (.) [ja **m- mää[rää**".
[time place manner. (.) [and a- amo[unt.
[((Joona looks at textbook))[((looks at teacher))
[((teacher looks at his textbook))=
26 Teacher: [kyllä.
[yes.
[=((teacher looks at his textbook))
27 (0.7)
28 Teacher: sano esimerkkejä. (1.0) adver[bista.
say some examples. (1.0) of ad[verbs.
[((teacher looks at his textbook))
29 (3.0) ((some students raise their hands))
30 Teacher: s´notaa et kolme esimerkkiä riittää.
let's say three examples is enough.
31 (2.8)
32 Teacher: Maria.
33 Maria: [**"liikaa".**
[*too much.*
[((Maria looks at her book))

Before this excerpt, the teacher has recapped the first group of particles, co-ordinating conjunctions which have just been tested. In the beginning of this excerpt (lines 1–8), he asks for the other group, subordinating conjunctions. He looks at his textbook while starting the question. In his question, he uses past tense (line 1). In Finnish, past tense (preterite) can be used for referring to the subjective perspective of the participants: the tempus refers to the experienced mutual past of participants (Hakulinen et al. 2004, 1459). With preterite the speaker then refers to the shared reference point in the near past, in this case, to the lists of conjunctions. Einari, who answers (line 6), knows them by heart. The interaction goes on fluently—but the pedagogic aim and reason for orally asking the exact same thing that the pupils have just written down in their test papers remains unexplicated.

The shift, from the tested groups of particles to the next group of particles, is marked in the tiny details of interaction, which seem not to be totally transparent to the pupils. The teacher starts the new topic by saying "*NO* (.) *sitten*" (line 10); the particle *no* ['well'] is often used in Finnish classroom interaction to mark the shift from one topic or activity to another (Tainio 2012b, 561), and the adverb *sitten* ['then'] supports this line of interpretation. In addition, the teacher's question is now presented in present tense (lines 12–14). Other than this, however, there is no change in the way the pedagogic discussion is carried out. The subtle change, marked only with a particle and verb tense, seems to confuse the pupils about the status of the pedagogic interaction. Their interaction demonstrates that they interpret it in two ways. Some of the pupils are starting to pick up the shift and open their textbooks; others leave the books unopened in their bags or on their desks. This reveals that the pupils are not certain whether the next topic about adverbs and interjections (line 18) is recapping what has already been learned or meant to be teaching a new content. According to our data, it is common that pupils be allowed to use their textbooks while participating in the pedagogic discussion in which a new topic is taught—in order to be able to search for information in the book. In addition, in other classrooms in our data, the teachers are very exact about the status of the textbooks, that is, whether the books can be opened or should stay unopened. Here, the teacher does not comment on either the status of the books or the pupils' activities of opening their books and answering his questions. However, it is clear for all participants that the pupils are reading the answers aloud directly from the textbook (lines 18, 25 and 33). Since the teacher accepts these answers, it becomes an acceptable way of answering. Furthermore, with this practice, the pupils are actually adopting the teacher's way of checking all the information directly from the textbook. The teacher looks at his book almost every time he asks a question or a pupil

gives an answer (see lines 1, 10, 18–19, 21, 25–26, 28). In this episode, the pedagogic discussion resembles a ritual where participants talk in a specific order, orchestrated by the teacher, reading aloud pieces of text from a shared source of knowledge, the textbook.

The second example comes from the classroom at Shore. Prior to this extract (Example 7-2), the teacher and the pupils had been discussing the organization of the music lessons for the next week. The pupils have had some ideas about what to do, and so the planning of the activities had been joint. The teacher praised the pupils about being innovative and active and said that they will plan more tomorrow and that they will now start talking about the actual subject of the lesson, mother tongue and literature. Then she moves to her table to use a document camera in order to reflect her text—or the "visual map" as she calls it (line 3)—via the screen to all participants. The teacher tells the pupils that they need a pen, an eraser, and a paper to be able to follow the teaching and the next task. She does not mention textbooks, and it is understood by the pupils that the books should be kept unopened. After the instructions, she refers to the previous lesson in which they had recapped some of the contents of grammar that they had been learning during the last years, and asks the pupils to name the topic of these discussions. Iivo finds the right concept (line 1). At this point the excerpt starts.

After Iivo's naming of the topic as parts of speech (line 1), the teacher gives informal and enthusiastic feedback (line 2). By asking the pupils to name the topic, and therefore to recall earlier discussions, the teacher shows the continuation of the earlier lessons into the current one; by this she refers to their mutual learning history. Then the teacher announces that she is going to draw a visual map as a description of parts of speech. She also says, in a humorous way, that she wants pupils to remember this map (lines 3–4). This announcement, as well as the activity itself, informs pupils about the teaching and learning strategies to be used and adopted. After some drawing and writing (lines 5–7), the teacher asks a question about the classification of words into different groups (line 8). The question is formulated in a tricky way; it calls for a selection of Finnish words as an answer. Nevertheless, Eki catches the point of the trick question immediately, and answers correctly: all words can be categorized into parts of speech (line 11). The teacher praises the answer with a compliment ("excellent", line 13) and with an uptake formulated syntactically in such a way that it can be interpreted as a compliment to all present participants, not only to the previous answerer (lines 13–14; the translation is modified into second person plural to reveal this meaning). This teacher turn also includes further references to the mutual learning history by referring to their learning since the fourth grade.

Example 7-2.

01 Iivo: sanaluokat.
parts of speech.
02 (0.2)
03 Teacher: ↑jee, (1.0) nyt me tehdään tähän se visuaalinen kartta, (.)
↑yay, (1.0) now we draw here the visual map, (.)
04 jonka mä toivon. (.) tallentuvan sun muistiin.
which I hope. (.) to be downloaded into your memory.
05 (0.9) ((teacher points to a paper on document camera))
06 Teacher: otsikko. (0.7) sen voi panna keskelle.
title. (0.7) that you can put in the middle.
07 (19.0) ((teacher and students write))
08 Teacher: mitkä suomen kielen sanoista. (0.8) ol luokiteltavissa.
which words of Finnish language. (0.8) can be categorized.
09 (1.4)
10 Teacher: Eki.
11 Eki: kaikki?
all of them?
12 (1.2)
13 Teacher: loistavaa. (.) tämä on menny perillet sieltä neljänneltä lähtiej jo
excellent. (.) this you have grasped thoroughly already in fourth
14 noin hyvin, (.) mut KAIKki? (.) mitä suusta tulee on luokiteltavissa.
grade that well, (.) but ALL? (.) that comes out of your mouth can be categorized.
15 (0.8)
16 Teacher: kuinka moneen ryhmään.
into how many categories.
17 (4.6)
18 Teacher: Oni.
19 (0.4)
20 Oni: oliks se kuutee?
was it six?
21 (1.5)
22 Teacher: hän kysyy? (.) Lenni vastaa.
she asks? (.) Lenni answers.
23 Lenni: onks seiska.
is it seven.
24 (.)
25 Teacher: seitsemää kaupattu, (.) kuutosta kaupattu. (.)[Eki.
seven is on sale, (.) six is on sale. (.) [Eki.
26 Eki: [se o varmaa kuus.
[it is probably six.
27 Teacher: se on kuus.
it is six.
28 Eki : nii
yea
29 Teacher: [joo.
[*yea.*
[((teacher smiles)]
30 Lenni: hm?
31 (1.0)
32 Teacher: ELI kuus se oli oikee vastaus Oni. (.) turha epäröidä.
SO six is the correct answer Oni. (.) no need to hesitate.
33 (1.0)
34 Teacher: meidän pitäs saadat tää, (.) seuraava[vaihe. (.) jaoteltua niin
we should get this, (.) next [phase. (.) divided so
[((teacher starts drawing))
35 [(1.1) että? (.) siitä muodostuis noin kuusi. - -
[(1.1) that? (.) there would be about six.- -
[((teacher draws))

In addition, the answer Eki gave (line 11) requires applying the knowledge they have learned, and not just repeating the information available in their textbook. In other words, the academic level is higher than just reading aloud in the textbook or remembering the information that has been taught.

The teacher's next question asks for an exact number of the parts of speech (line 16). The answers show that in this classroom the pupils are not afraid of answering incorrectly, even if this is the case in many Finnish classrooms (Tainio and Laine 2015). Both Oni (line 20) and Lenni (line 23) formulate their answers as guesses, and the teacher plays humorously with their answers (line 25). After Eki's hesitant answer, which contains the same number as Oni's previous one, the teacher confirms the number of categories as six. She also encourages Oni to be more confident about her knowledge (line 32). After that the teacher starts drawing the "visual map".

In this episode, the number of parts of speech is considered as a fact that needs no more explaining. However, since (Finnish) language is seen differently in different linguistic frameworks and traditions of grammar, the number of parts of speech may vary. This is also the case in textbooks for primary education. Nevertheless, this number, six parts of speech, is consistent with the number mentioned in the textbook they use in these classrooms.

In the Example 7-2, the pupils are well aware of the role of the texts is in this episode; The textbook is not needed, and the books remain unopened on the pupils' desks. Instead, they are encouraged to recall the general ideas concerning parts of speech. This knowledge will then be gathered as a joint text with the help of the document camera, and is visible for all the students.

So, in sum and in relation to the practices that were mentioned as those most interesting in terms of this study, the episodes in Park and Shore share many characteristics. However, they also appear to be quite different in important aspects. First, in both episodes the status of the text was prominent, but in very different ways. In Park, the textbook was guiding the interaction and participation as well as the instruction and information. Still, the role of the textbook was unclear for the pupils: they did not know whether they should have their textbooks opened or closed. In Shore, the status of the textbook was clear to everybody: the textbook was left unopened but the aim of the pedagogic discussion was to use it as a cognitive artifact in the creation of a joint text. Second, in both of these episodes the IRE sequence (Initiation–Response–Evaluation, e.g. Mehan 1979) with questions-with-known answers (Macbeth 2004) was dominating and used throughout the pedagogic discussion. However,

in Park there were no teacher uptakes or elaborations of pupil answers, while in Shore there were various kinds of them. In Shore, the teacher responded with an exclamation ("yay", line 3), with appreciation and its elaboration (lines 13–14), with uptake and humor (lines 22, 25), and with encouragement (line 32). Third, in Park there were no references to mutual learning history or strategies of teaching and learning, while in Shore there were several of them (lines 3–4, 13–14). Fourth, the level of academic demands was very low in Park since the teacher accepted reading aloud directly from the textbook as a sufficient way to answer. In Shore, the academic demands were higher since the teacher demanded not only recalling previously learned information but also applying it.

But are these differently organized discourses reflected in the participants' views on the interaction, their views on the textbook, and their views on teaching and learning in these classrooms? The interviews with the teachers offer evidence that at least the views on the textbook were clearly different. While the Park teacher said that he more or less liked the book: "mostly I have positive, positive y'know feelings so of course there are things that could be presented better but yes it is quite okay", the Shore teacher explained that she is not satisfied with this textbook, or any other book she has used: "well I have never been satisfied with any textbook during these thirty years as a teacher, and particularly mother tongue textbooks I have found unsatisfactory and today I am not satisfied with this Kirjakuja". Regarding the attitudes towards pupils, the Shore teacher praises her pupils and talks very positively about them: "this kind of group that enjoys and loves discussions, they'd prefer always just to discuss and they are brilliant and good"; meanwhile the Park teacher barely refers to his pupils at all. All the pupils at Park say that they do not like their textbooks very much: "well, it depends", but it is "always" used in the lessons. In contrast, the Shore pupils say more clearly, and in more detail, that they like their textbook: "to my mind, it is nice or there are nice, those, fairy tales, or those, those stories" and that is used sometimes, but it could be used even more often.

So, interestingly, even if the Park teacher likes the textbook, his pupils do not. In Shore, the situation is the opposite: The pupils seem to like the book better than the teacher who is quite critical of it. How can this difference be explained? One explanation might be found in the social organization of the classrooms. The Park pupils see their teacher as a "boss" who commands but is somewhat passive, while the Shore pupils see their teacher as "a bit odd" but as an organizer that engages them in joint planning and discussions and offers them various kinds of interesting working practices. Maybe this is one of the reasons why, in the interviews, the Park pupils appear to lack motivation and do not have very positive views on mother tongue lessons, while the Shore pupils

show more pronounced motivation and have more positive views on learning mother tongue. The Shore pupils refer to many activities that they consider as "nice," such as discussing, doing group work, reading together, and writing texts with computers. All in all, the interviews show that the pupils in Shore are more engaged in the subject than those at Park.

Discussion

In reference to the analyses of the episodes of recapping the learned within these two classrooms, my conclusion is that the classroom practices identified in Park shares more with those practices identified as typical of monologically organized discourses. The organization of the interaction follows the organization of the textbook to the extent that it can be said to be organized "by the book". The role of the textbook both as material and cognitive artifact was thus pronounced. The textbook content was used as a cognitive artifact since the textbook was the content of learning as well as the model for teaching and learning in interaction. In addition, there were no explicit references or connections to the mutual learning history or the learning and teaching strategies, and most important, no uptakes or elaborations of student answers. In Shore, the discourse shared more with those practices that have been identified as typical of dialogically organized discourses. The textbook was not central in the organization of interaction; in focus was the jointly created text that was visually shared by all participants. There were several explicit references to the mutual work and learning history in the classroom as well as references to learning and teaching strategies. The uptakes and elaborations of pupil answers were frequent and supportive. What was common, however, was that in both lessons the textbooks were used as a cognitive artifact in the sense that content was taught exactly in line with textbook content, even if in Shore the discourse around the content seemed to support more open interaction and participation than in Park.

The analyses reveal that the use of texts in classroom interaction can be seen as central for the organization of discourse. From the methodological point of view, the results suggest that analyzing classroom interaction and participation in reference to the text used in the lesson is a fruitful starting point. Furthermore, the analyses show that even if the interaction is dominated by the teacherinitiated IRE structure, which is usually the case when the topic is recapping previously learned material, there are several interactional and pedagogic practices that can be used to modify the discourse as more dialogic. This leads us to some practical implications. First of all, in reference to the analysis, the role of an instructional text (in terms of content, interaction, and participation) should be flexible but clear for the students. Second, clear references to teaching

strategy and mutual learning history seem to be very important. Third, uptakes and elaborations of student responses are significant for participation and student motivation. According to our data, humor and encouragement also seem to be important as supportive parts of interaction in a teacher's attempts to get students interested in the subject.

All in all, what can be learned from these kinds of analyses is that exploring the details of naturally occurring classroom data can be helpful both for professional teachers as well as student teachers in reflecting on the organization of educational discussion. In this analysis, one of the main findings is that textbooks can be used in ways that lead to a more dialogical organization of interaction, even during episodes of recapping previously learned topics—in spite of the fact that these episodes consist mainly of IRE-sequences and usually contain questions-with-known-answers. In addition, teachers should pay attention to the ways in which they introduce a new topic and link it to previously learned material, as well as the ways in which they respond to student answers. There are many interactional strategies available to adopt in efforts to get pupils motivated and interested in the subject to be studied.

Acknowledges

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Appendix A

Transcription conventions.

[ ]	Point of overlap onset and termination
=	No interval between adjacent utterances
(0.6)	Interval between utterances
(.)	Short untimed pause
word	Speaker emphasis
e:r	Lengthening of the sound
-	Abrupt cut-off
? /, /.	Rising/low rising/falling intonation
WORD	Loud sounds relative to surrounding talk
↓↑	Marked shifts into higher or lower pitch
(( ))	Transcriber's comment

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CHAPTER EIGHT

PROMOTING BASIC ARITHMETIC CONCEPTS THROUGH LANGUAGE AND EMBODIED PRACTICES

Friederike Kern, Sören Ohlhus, and Thomas Rottmann

Introduction

This chapter presents results from an interdisciplinary research project aimed at gaining insight into the role of language and gesture in mathematical learning processes. The focus of this project is on the practices of number reference that are shaped by the situational constellations of different semiotic resources available to both teacher and student. The practices are embedded in a routine procedure in which verbalisation and handling material (abacus) both play an important role. The data stem has been collected in an intervention programme for primary school children with severe learning difficulties in basic arithmetic.

Context of the study

Bielefeld University was one of the first universities in Germany to provide a non-commercial ”Counselling Centre for Dyscalculic Children” (since the end of the 1970s). Apart from research activities and advice in the form of (telephone) consultations, the centre offers individual tutoring sessions for primary children who experience severe difficulties in learning whole number arithmetic. The content of the intervention is not necessarily the current content of lessons in school but rather focuses on individual competencies and learning difficulties. Children who are accepted for the intervention programme predominantly struggle in developing: 1) a deep understanding of place value (e.g. knowing the value of figures in numerals, which includes the understanding of activities of bundling and unbundling for transitions between digits; Wartha and Schulz 2012); 2) non-counting strategies for addition and subtraction (like ”bridging tens”, e.g. 48+7 by 48+2=50 and 50+5=55; Foxman and Beishuizen 2002).

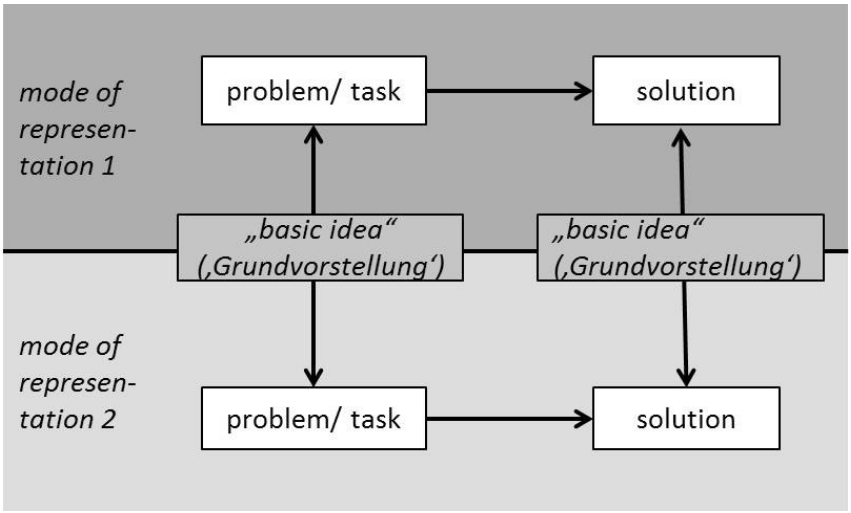
The intervention programme’s main intention is to support the development of basic ideas for numbers and (non-counting) operations on them. To support this process the intervention programme follows a Four-Phases-Model that initiates a step-by-step replacement of manipulatives and acknowledges the need for verbal descriptions when manipulating concrete objects.

Developing basic ideas

The German term "Grundvorstellungen" was introduced by vom Hofe (1998) and can be translated as "basic ideas". Basic ideas can be regarded as "elements of connection or as objects of transition between the world of mathematics and the individual world of thinking" of a learner (vom Hofe 1998, 320). In this sense, basic ideas of mathematical concepts are relevant for transitions from real life situations to mathematical models, e.g. when solving word problems.

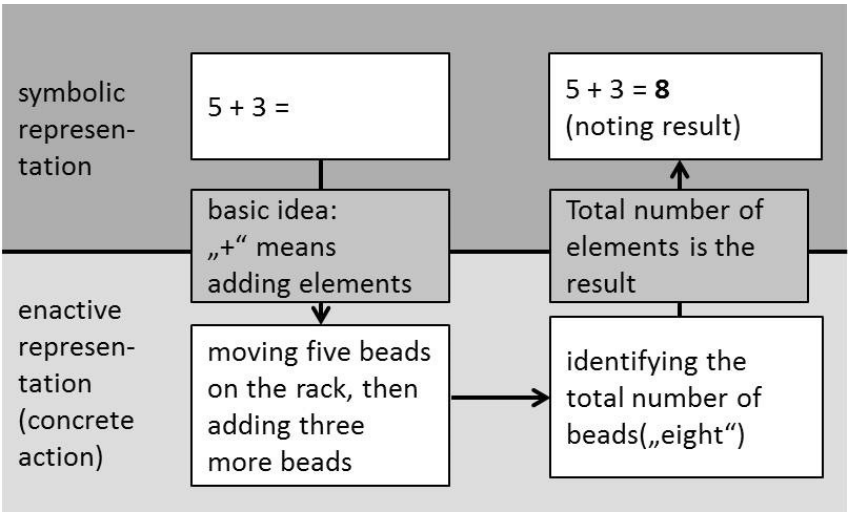
Wartha (2011) uses the term "Grundvorstellungen" in a more general way; in his view, basic ideas need to be activated for any transition from one mode of representation into another (see Figure 8-1).

Figure 8-1. Basic ideas



Basic ideas are also used when a child works on a given symbolic calculation task (e.g. 5+3) by manipulating a material, e.g. an abacus. The child has to transfer the symbolic representation into a suitable activity to be performed on the material by activating a basic idea of "addition" as the concrete action of "adding elements to one another" (in this example: moving five beads and another three beads on the abacus). Finally, the child has to interpret the total number of elements (beads on the abacus) as the result of the calculation, which can be represented with a numerical symbol ("8"; see Figure 8-2).

Figure 8-2. Basic ideas in solving the task 5+3



The Four-Phases-Model for the development of basic ideas

Low achievers tend to use manipulatives exclusively as counting aids without utilising any structure of the material, e.g. handling units of 5 and 10 instead of single items to illustrate numbers (cf. Rottmann and Schipper 2002). They do not move bigger units (e.g. in the task 26+7 the four remaining beads in the third row as one unit to reach 30), but only single beads. The movement of single beads is usually accompanied by counting in units of ones. Furthermore, Uttal et al. (1997) provide a critical view of using a variety of manipulatives. They stress the importance of connecting manipulatives to mathematical concepts and symbols, and point out that the use of different types of manipulatives may impede the development of those connections:

> “Using many different kinds of bright, beautiful manipulatives may push children’s attention toward the objects themselves and away from where it needs to be—on the relation of the symbol to what the children are supposed to learn” (50).

In accordance with this position, intervention programmes in Germany share the view that all materials and manipulatives that illustrate mathematical concepts need to be introduced systematically, and their application should be guided. Therefore, the number of manipulates used in lessons should be limited (e.g. Kaufmann and Wessolowski 2006; Wartha and Schulz 2012). The intervention programme at Bielefeld University primarily uses the abacus and "Dienes blocks" as manipulatives for solving addition and subtraction problems.

The exclusive and rigidified dependence on counting strategies by low achievers (Gaidoschik 2012) can be regarded as an indication of insufficiently developed and activated basic ideas of computation strategies. To support the development of basic ideas, the intervention programme at Bielefeld University is based on activities that foster the internalisation process in order to master the shift from manipulating materials to mental calculations. A central feature of the programme is a step-by-step replacement of concrete actions with materials by verbal descriptions. Wartha and Schulz (2012) describe this approach as a Four-Phases-Model (see Table 8-1; cf. Rottmann and Peter-Koop 2015). This model is based on initial ideas of Bruner (1973), who strongly links learning processes to the translation of one representational system (enactive, iconic, or symbolic) into another. In further development of Bruner's theory, the Swiss psychologist Aebli (1976) describes gradual internalisation processes as transitions from enactive to mental actions. Furthermore, he stresses the role of verbalisations as "substituting actions". The Four-Phases-Model therefore focuses on "translations" between different modes of representation (manipulation, visual representation, imagination, verbalisation), with the intent to connect these modes to each other. It is worth noting that though several other intervention programmes are also based on the use of translations between different modes of representation (e.g. Kaufmann and Wessolowski 2006), the use of covered manipulatives and verbalisations in a systematic way is specific for the programme presented in this paper.

Table 8-1 provides an overview of the phases as they are performed during the intervention programme. The four phases regulate the accessibility of the abacus as the central semiotic resource. There is, however, considerable variation in the use of semiotic resources (abacus, speech, gestures, writing), depending on participants and a range of situational circumstances. It is the objective of this paper to describe the variations of practices of number reference as systematically organised joint actions that make use of semiotic resources at hand to (re-) organise ongoing calculation processes.

Table 8-1. Four-Phases-Model to support the development of basic computational ideas

Phase 1	**Concrete usage of manipulatives and verbalisation of operations** Teacher and child actively use the material and verbally describe their operations and their meaning. When the child is confident in working with the material, the child takes over and verbalises the operation itself.
Phase 2	**Verbal description of the imaginative use of the manipulative in sight** With the manipulative in sight, the child describes the operations on the manipulative to the teacher or a fellow student who performs the according operations following the child's descriptions.
Phase 3	**Verbal description of the imaginative use of the covered manipulative** With the manipulative covered by a screen/shield, the child describes the operations on the manipulative to the teacher or a fellow student who performs the according operations following the child's descriptions.
Phase 4	**Verbal description of the mental operation** The child verbally describes the operations without the manipulative being present in any form other than the child's imagination. The tasks are given in a symbolic representation.

Data, theory, and method of analysis

Our data consist of videotaped lessons of children attending weekly tutorial sessions for four months, following the Four-Phases-Model. The child sits at a table with one or two tutors and an abacus, located between them. The video camera is positioned facing the child. Sometimes, there is also a paper and a pen at the child’s disposal.

From a linguistic and interactional perspective, the tutorial sessions feature a rich array of semiotic resources arranged around the abacus, which constitutes the (sometimes absent) visual and haptic centre of the calculation process.

The different phases of the intervention programme can be described as the establishment of different participation frameworks (Goodwin and Goodwin 2004; Goodwin 2007). Participation frameworks are spatial constellations of interactants and material that provide semiotic resources for the organisation of situated joint activities; they thus "create a visible, public locus for attention and action that includes both relevant structure in the environment and the actions and bodies of other participants" (Goodwin 2007, 59). Access to semiotic resources is jointly arranged, and the rules of participation are established and transformed on the basis of moment-to-moment changes. Even though participation frameworks are deeply dynamic, we argue that the four phases of the intervention programme can be understood as providing different participation frameworks, as they arrange participation by regulating the available material. In other words, the different phases provide the opportunity to treat different semiotic resources as relevant during the ongoing interaction. Shifting relevance structures like this constitute different "contextual configurations" in which action is carried out and meaning is established (Goodwin 2000).

From an ethno-methodological perspective, the meaning-making process in conversation can be understood as the participants' visible—i.e. accountable—dealings with recurrent organisational problems. The systematic solutions to these problems provide insight into the orderliness of social practice and the practical knowledge of interactants. The methodical description of solutions as practices allows cross-sectional as well as longitudinal comparative analysis. By reconstructing the phase-specific participation frameworks, with focus on the change and adaption of semiotic resources in order to solve locally arising mathematical (and other) problems, we thus hope to gain more understanding of children's situated learning processes, and, in the long term, of how these learning processes can be further supported by methodical arrangements of semiotic resources (i.e. specific "contextual configurations").

In the following analyses, we will focus on different practices of number reference in the context of the interactive calculation process. Referring to numbers is one of the regularly occurring organisational problems within mathematical discourse; it can thus be regarded as a central feature. In the tutorials of the intervention programme, practices of number reference occur frequently during performances of what we call "step-by-step computational strategies" and are

thus an essential part of doing arithmetics in this context. One of the strategies is called "bridging tens", for which the appropriate splitting of the second addend is essential (27+7 is split into 27+3=30 and 30+4=34).

The cases are taken from a larger corpus collected at Bielefeld University, Germany. The analysis is based on two sessions with two different children. The sessions demonstrate the typical use of an abacus and can each be regarded as single instantiations of the Four-Phases-Model; however, they exhibit striking differences in the ways the children realise verbalisations as translations between modes of representation. The analysis focuses exclusively on addition and subtraction tasks of the type "1- or 2-digit number plus/minus 1-digit number", which are the predominant types of calculation tasks in the early phases of the intervention programme. The first two extracts are taken from one session and illustrate how the second and third phases are introduced for the first time. The third extract is from a session with a different child (and tutor) and includes the practice of writing as an additional semiotic resource.

Results: Practices of number reference

Data analysis reveals different practices of number reference that are adapted to the specific contextual configurations and participation frameworks. The practices can be distinguished by the semiotic resources they exploit, and the way they combine them in the process of calculation.

When examining the semiotic resources that are used to establish number references, we can broadly distinguish three relevant aspects that are part of the respective contextual configurations:

1. The position of each number in the structured sequence of the calculation process, which determines its mathematical function: a number might appear as the first or the second addend of a (given) task, or as a newly discovered number (e.g. the first number the second addend can be split into, or an intermediate result, or the final result). To successfully use this context for clarifying number references it is crucial to keep track of "where" in the linear organisation of the calculation process the participant "is" at the moment.

2. The shared visual field: a number can be referred to by employing its visual representation on the abacus as a constellation of beads. This may involve manipulations of the abacus, pointing gestures and/or deictic expressions.

3. Written notes: a number can be written down as part of the notation of the task, following the conventions of mathematical symbolism. This adds another visual aspect to the contextual configuration that can be used as a public semiotic resource to establish reference to numbers or operations.

Different ways to combine the three aspects with changing verbalisations are employed in any of the four phases and in changing contextual configurations. The extracts below show practices of number reference: 1) against the background of the linear order of the calculation process; 2) combined with practices of pointing; or 3) with verbalisation of the abacus' visual characteristics as a semiotic resource. Additionally, written versions of the arithmetic task and its numbers play an important role in the calculation process of the final example.

Establishing positions for number reference in calculation sequences

To assist the children, tutors establish a sequential pattern, which quickly develops into a joint routine performance. It is characterised by the above described type of mathematical tasks (e.g. 62+9) as well as by the use of the abacus. It entails the following positions:

1. Tutor's task formulation (62+9)
2a. Setting the **first addend**'s tens and ones on the abacus (60)
2b. Setting the first addend's ones on the abacus (2)
2c. Naming the number thus set (62)
3a. Setting the *first part* of the **second addend** (and, by doing so, "bridging the next ten", e.g., 8)
3b. Formulating the intermediate result (70)
3c. Setting the *second part* of the second addend (1)
4. Formulating the final **result** (71)
(5. Reworking the calculation process communicatively)

The positions of the calculation sequence feature routine verbal and embodied practices that the children are taught during the first session and that remain the same until the very end. They function as indicators of the children's familiarity with the calculation process and are also used as a learning aid to support the acquisition of the appropriate mathematical skills. The entire pattern, with its verbal and embodied routines, serves as an important device to translate between the different modes of representation (see section 2.2).

The following extracts presents an instantiation of the positions 3a-3c above, where the strategy of "bridging the ten" is performed. In the first extract (8-1) below, the child Malte has to solve the task 27+7. The participation framework is set according to phase 2: Malte can see the abacus, but is not allowed to touch it while instructing his tutor how to move the beads. Before the beginning of the extract, the tutor has already moved 20 beads to the left. The extract begins with position 2b, where Malte addresses the second part of the first addend: He refers to "seven" as the remainder of the first addend (line 12), then (after a clarification check with regard to the task on line 16) to "three" as the first part of the second addend (line 20, position 3a) and finally to "thirty" as an intermediate result (position 3b).

All number references take place in the sequential context of the interactive calculation process: their exact positions in this process provide important background knowledge for the participants. Due to their sequential position and thus defined function in the calculation process, the number references in positions 2b and 3a are part of the Malte's *instructions* to the tutor to manipulate beads on the abacus. In contrast, the reference to "30" on line 25 is not followed by any manipulation because its position in the process clarifies that it is an intermediate result (position 3b). It could thus be called a description of the present constellation of beads on the abacus.

To establish the changing sequential positions on the abacus, Malte (like other children) predominantly relies on verbal means:

- Malte introduces a new calculation step by prefacing the utterance with "and then" (line 11 and 20; see also the tutor's formulation on line 23 introducing position 3b). By this, he establishes a linear order of the single positions.

- In addition, on line 20, a specific formulation addresses the present step in the calculation explicitly as the first in a ordered list of more steps to come ("and then **first** the three").

- A third way is employed by the tutor on line 23 when she asks Malte "and where am I then"? The calculation process is thus metaphorically conceptualised as a movement in space and/or time.

Extract 8-1.

Position 2b
011 mal [und dann]
and then
012 °h **die sieben** daZU?
add the seven to it
013 *((points with pen to the 7th bead in the 3rd row))*
014 tut ja,
015 ((*moves the beads*))

back to Position 1
016 mal siebenundzwanzig plus SIEben?
twenty seven plus seven
017 *((looks at tut))*
018 tut genau.
precisely
019 mal *((looks back at abacus))*

Position 3a
020 und dann °h (.) erst **die DREI**?
and then first the three
021 *((points with pen to the remaining three beads))*
022 tut die DREI,=
the three

Position 3b
023 =und wo BIN ich dann,
and where am I then
024 *((moves three beads))*
025 mal [bei (.) der [DREISsig;
at the thirty
026 [*((looks at abacus))* [*((looks at tut))*
027 tut hm, klasse,(4)
well done
028 *((keeps index finger in the air))*

The extract thus demonstrates different ways of establishing a specific position for a number reference within the sequence of the calculation process. This position clarifies the local meaning of the numbers. The jointly and publicly established shared knowledge serves as an interpretive basis for practices of number reference.

We will now turn to additional practices that include semiotic resources provided by the changing participation frameworks.

Looking and pointing: Number reference within a shared visual field

In the first part of Extract 8-1 (lines 12 to 22), both occurrences of number references (lines 12 and 20) are realised primarily as deictic references to the beads on the abacus: Malte looks at it, bends forward and points to the exact place on the abacus to show the tutor which beads to manipulate. This pointing gesture is accompanied by verbal references in the form of nominal phrases with a definite article: "the seven" and "the three" respectively. From a grammatical point of view, the function of the definite article is to indicate the epistemic status of the following reference as something known to the participants. Instead of being abstract numbers, "the seven" and "the three" are numbers-in-the-given-situation-on-the-abacus. And they are "known" because of the fact that Malte is pointing at them. So, the shared visual field and Malte's embodied action of pointing within it are crucial resources in this performance of the calculation task.

Central to Malte's complex practice of number reference in this particular participation framework are his visual focus on the abacus and his subsequent pointing gesture that is accompanied by a bodily shift towards the abacus. The number words gain their specific meaning through the beads on the abacus at which Malte is pointing. The shared visual field is the basis of this meaning-making process. Additionally, Malte employs the routine linear structure of the calculation process as a further context of the number words: by explicitly signaling the beginning of a new position in the calculation process, he allocates additional task-related meaning to the number words (i.e. the "seven" as the ones of the first addend and the "three" as the first part of the second addend).

We call this practice of number reference "looking and pointing", thereby acknowledging the relevance of the shared visual field and the employment of pointing gestures within the participation framework as a major part of this deeply contextualized meaning-making process. With his practice of looking and showing, Malte sets up a contextual configuration that is grounded in the shared visual field.

In the second part of Extract 8-1 (starting at line 023), when the tutor attempts to elicit the intermediary result (position 3b), no pointing gestures occur along with Malte's number reference (line 25). However, Malte still uses the definite article ("the thirty") while closely looking at the abacus. Therefore, even though there is still a strong orientation to the visual field, it is not shared or made interactively relevant by a pointing gesture. This difference could be

explained by reference to the scheme above: In position 2b and 3a the intent is to "instruct" the tutor to move beads on the abacus. The pointing gestures, along with the number words, help to identify them. In position 3b, the tutor does not have to be guided to move beads; instead it is sufficient to look at the abacus and "describe" the present constellation of beads as the intermediate result of the calculation process (in this case in response to the tutor's check of understanding).

In sum, a similar contextual configuration within a given participation framework can give rise to various practices of number reference that are noticeably chosen as a function of the exact calculation step. Whereas pointing appears as a main resource during the "instructions" that actually require beads to move on the abacus, other tasks, such as stating the intermediate result, require zooming out for a "description" of the complete constellation on the abacus. In this case, pointing is not involved.

Number reference by verbal means

The next task, 19+7, immediately follows the first one in Malte's lesson. It takes place under conditions of phase 3—that is, now the abacus is hidden behind a screen while Malte instructs the tutor how to move the beads on the abacus. The changed participation framework goes along with a reduced opportunity of embodiment: "looking" and "pointing" are not possible any more. Under these circumstances, changing practices of number references that only rely on verbal means can be observed.

Just before extract 8-2 starts, the tutor has set the ten on the abacus (position 2a). Malte tells her how to proceed.

First, on line 115, Malte is referring to "9" (as the second part of the first addend 19) by "and then nine to it", thus using the zero article with no accompanying pointing gesture. Hence, he does not refer to it as a known entity like he did in the former task when referring to "*the* seven". Thus, along with the visual detachment that makes pointing impossible, we find a decontextualisation in the linguistic form of reference. Malte does not refer to the number as a specific and obvious constellation of beads on the (possibly imagined) abacus but as a numerical symbol that obtains its local meaning by its position in the calculation process. In this sense, Malte seems to operate on the basis of an abstract, more mathematical conceptualization of the number. We regard this observable change as a window into a learning process, because it demonstrates an at least gradual detachment from the directly accessible perceptual space to a cognitive space.

Extract 8-2.

Position 2b

115 mal (2.0) und dann (.) **neun** daZU?
and then nine to it
116 tut neun EINer,=ne,
nine ones
117 mal hm_hm, ((nods))
118 tut ja_a, ((*moves beads*))
119 (1.0)
(…)

Position 3

123 mal <<acc> und dann noch **sieben** dazu;>
and then seven to it
((looks at tut))
124 tut (-) ja
yes
wie=wie würdest du_s am rechenrahmen sieben (.) jetzt MACHen,
how would you do the seven on the abacus

Position 3a

125 mal ((*looks in front of himself*, 3.0)
126 ((*looks at tut*))
127 **erst noch die RESTlichen die dahinten in der REIhe sind?**
first the remaining ones back there in the row
128 ((*waving gesture with hand*))
129 tut und wieviel SIND das?
and how many are theses
130 mal **EIner**;
one
131 tut Einer,= okay, ((*moves beads on the abacus*))
one

In the second part of the extract, when instructing the tutor simply "to add seven" (again with a zero article, line 123), Malte effectively avoids to decompose the second addend to 1 and 6 in order to bridge the next ten and thus does not display his understanding of the "basic addition strategies".

Accordingly, the tutors's follow up question (line 129) compels Malte to attend to the process of decomposing "7", after all. However, again he avoids producing a numeral "1", and uses the verbal expression "the remaining ones back there in the row" (in the plural!). From a linguistic point of view, Malte produces a complex syntactical unit that is functional in the situation at hand insofar as it would enable the tutor to move the correct amount of beads. However, at the same time, it allows him to remain effectively vague about the number value.

The verbalisation is accompanied by an indistinct waving gesture possibly expressing "pushing". It can be interpreted as the remaining trace of an actual hand movement produced earlier in the session in which Malte was still manipulating the abacus himself or giving his tutor instructions by pointing within a shared visual space. Hence, Malte's practice is unspecified in terms of number values but quite specific in terms of an imagined manipulation of the abacus. In other words, Malte seems to operate on the basis of a visualised imagination of the abacus to solve the arithmetic problem at hand. At this point, he might be at least partly engaged in a participation framework that involves the visual presence of the abacus: the translation into the language of mathematical symbolisation succeeds only after the tutor asks again after the amount of beads, Malte produces the desired number word.

In sum, whereas a slight change could be observed in the first practice of number reference (line 115), the subsequent number references show that Malte is still struggling to adjust to the transformed participation framework that involves the hidden abacus. Whereas linguistic decontextualisation is successfully performed at first as a direct result of the changed visual field (that does not include the abacus anymore), the imagined abacus becomes an important resource as soon as an arithmetic problem occurs (i.e. splitting the second addend into two numbers to bridge the next ten). An effortless translation from one representational mode to another as it is implied in the concept of basic ideas is not yet achieved. Malte still needs the abacus to decompose numbers effectively.

Reference to written numbers

In considering semiotic resources in the practice of number reference, we will look at a final case in which writing plays an important role in the calculation process. Extract 8-3 is taken from a session with Afra, whose tutorial shows many structural similarities to Malte's, including the handling of the abacus and verbal routines during the phases. However, a major difference involves the use of writing as an additional semiotic resource.

In the following extract, the task 62+9 has to be solved. The extract belongs to phase 2, meaning that Afra can see the rack, but is not allowed to touch and manipulate it herself. Afra has just written the task on a sheet of paper and begins to instruct her tutor to manipulate the abacus accordingly.

Extract 8-3.

Position 2a

013 afr sechzig (.) einstellen,
set sixty
((looks at paper))
014 se:chs ZEHner,
six tens
((looks at abacus, then at tut))
015 tut ((*moves 6 rows of beads from right to left*))

Position 2b

016 afr und zwei EINer-
((looks at abacus))
and two ones
017 tut ((*moves two beads from right to left)*)
018 so,
like this

Position 3a

019 afr *((looks at paper in front of her and points with pen to it))*
020 **PLUS**,
plus
021 erstmal (.) |die acht daZUschieben,
first *move the eigth to it*
| *((points with pencil to 8 remaining beads, then*
produces a wiping movement with pencil from left
to right, then looks at tut))
022 tut hm_hm,

The sequential structure of this extract is much like the ones above, but the verbalisations of number references differ from Malte's. On lines 14 and 16, Afra refers to tens and ones, thereby explicating the numbers' place value. On line 20, instead of opening the new calculation step by a simple and narrative-like temporal adverb ("and then"), Afra says 'plus', thus producing the mathematical symbol of the operation to be performed next.

At first glance, Afra appears to employ a more mathematical practice of staging the interactive calculation process compared to Malte, but on closer inspection, this seemingly mathematical competence is again deeply rooted in the semiotic resources and changing contextual configurations, including the abacus *and* the written task in front of her. It is the continuing change of orientation

between these resources that characterises Afra's number references and her verbal choices, as the following descriptions show:

- Afra starts by referring to 'sixty' while looking at the written task (line 13).

- She reformulates it to 'six tens', now looking at the abacus and then to the tutor (line 14).

The translation of the written number "60" into its equivalent "six tens" is made to fit the structure of the abacus and serves as an instruction to the tutor. The translation process is visually organised by a change of gaze, from the paper to the abacus and subsequently to the tutor. The next step (position 2b, line 16) is then produced by Afra, with her gaze moving back to the abacus.

The reference to the first part of the second addend ("eight", line 21) is again divided into two steps:

- When expressing the concatenation with the mathematical "plus", Afra looks at (and points to) the written task on her paper where she sees the symbol "+" (line 20)

- Next, she employs the practice of looking and pointing by looking at the abacus and by pointing to the eight beads the tutor needs to move next. The practice is accompanied by a nominal phrase containing a definite article ("the eight"). The packaging of the utterance as an instruction is achieved by the use of the verb "dazuschieben/move over there" and a waving gesture similar to the one Malte uses in extract 8-2 above.

The two orientations are smoothly organized as a step-by-step bidirectional translation between the semiotic resources at hand that entail different modes of representation. Afra brings together the mathematical symbols on her notes and the manipulation of the abacus in front of her, and connects two representations of the same computational strategy (adding).

In sum, the participation framework that includes the written task provides Afra (and her tutor) with opportunities to quickly change the contextual configurations in order to set a new relevance structure when it is assumed helpful for the process of understanding. The use of written and spoken mathematical symbols is alternated with the practice of looking and pointing: the verbal means

are adapted accordingly. The meaning-making process employs changing contextual configurations within the given participation framework, shifting from a more decontextualised practice to an embodied practice when a problem occurs.

Discussion

The practices of number references illustrated are deeply embedded in the sequential context and can be described as adaptions to a particular participation framework. Attention was drawn to the fact that the children exploit given contextual configurations by using different practices of number reference in order to perform addition tasks. The practices can be described as shifts of contextual configurations which set up specific relevance structures to support the process of translation between modes of representation. The shift is predominantly organised when mathematical or other problems occur. In those cases, the visual grounding of mathematical practices, which is central to the underlying concept of the programme, plays an important role.

In Extracts 8-1 and 8-2, Malte shifted from "doing calculating by looking and pointing" to "doing calculating by speaking". He acts upon his imagination of the abacus, which remains vague at first, at least when he first attempts to solve the task under the conditions of phase 3. The tutor's follow-up question supports him to produce the correct mathematical symbol. In Extract 8-3, the participation framework in which Afra acts provides her with the additional semiotic resource of written notes for performing number references. But this additional situational complexity poses no problem for Afra; quite on the contrary, she connects the different modes of representation—abacus and written task—in each step to produce the number references in different practices that complement each other.

To conclude, the changing participation frameworks create different opportunities for using the perceptual space for number references. Additional resources, such as writing, provide further opportunities to change and adapt number reference practices. The local performances of the step-by-step arithmetic strategy appear as mutual accomplishments that rely on the coordinated use of semiotic resources and that create situated meanings of number words. As learning arithmetics is conceptualised as the transfer to different representational modes according to basic ideas, the acquisition process becomes observable in the changing practices of number reference: In shifting verbal routines on the one hand (like the shift from "the seven" to "nine"), and the decline of embodied practices (such as "looking and pointing") on the other.

Implications for teaching practice and future research

In this chapter, we have described practices of number reference within the changing participation frameworks provided by the phases of the programme. We provided at a detailed description of the relevant situational and individual differences and explored the underlying systematics of the use of material, linguistic, and multi-modal semiotic resources. The focus was on the underlying problem of number reference that occurs in every mathematical discourse, while special attention was payed to local problems that children encounter when they need to refer to numbers in the concrete course of the calculation.

So far, the analyses show that in order to develop basic ideas it is not sufficient to just introduce material into learning processes (as is often the case in primary classes in Germany). Instead, the material needs to be deeply embedded in the use of other semiotic resources (including specific verbalisations), while shifting between different contextual figurations, in order to assist the children in learning basic ideas. Teaching practices should thus embrace the variety of interactive practices that make the deployment of these materials more fruitful, and design individually adapted teaching environments. Future research needs to analyse and evaluate longterm effects of such usage of materials, along with other semiotic resources, on the mathematical learning processes of children.

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CHAPTER NINE

USING MANIPULATIVES FOR TEACHING EQUATION CONCEPTS IN LANGUAGING-BASED CLASSROOMS

Daranee Lehtonen and Jorma Joutsenlahti

Introduction

Conceptual understanding is one of the most important proficiencies in mathematics. It enhances students' learning fluency and retention, facilitates their learning of new concepts, helps them to avoid errors, and promotes self-discovery (NRC 2001, 116–20). Moreover, it has been acknowledged that students' low performance in mathematics can result from an inadequate understanding of mathematical concepts (NRC 2001, 17–18; Ojose and Sexton 2009, 4). Nevertheless, school mathematics has typically emphasised algorithmic skills (Attorps 2006, 1; NRC 2001, 4). Recently, several countries have reformed their mathematics curricula in favour of conceptual understanding, instead of relying entirely on algorithms (e.g. Australian Curriculum, Assessment and Reporting Authority 2015; Common Core State Standards Initiative 2010; Finnish National Board of Education 2015).

Based on the work of Piaget, Bruner, and Montessori, educators and researchers have advocated the use of manipulative materials as hands-on learning tools for mathematical concepts understanding (McNeil and Jarvin 2007, 310; Uttal et al. 2013, 2). Previous studies have demonstrated that manipulatives assist children in developing their understanding of abstract mathematical concepts through multimodality and experiential learning (Puchner et al. 2010, 314; Uttal et al. 2013, 2). On the other hand, there is also a considerable amount of research that has demonstrated that manipulatives have no benefits to learners, and can sometimes even obstruct their learning (Martin, Svihla, and Smith 2012, 1–2; McNeil and Jarvin 2007, 312; Uttal et al. 2013, 2). The fact that the benefits of manipulatives are debatable has therefore caused uncertainties when it comes to applying them in practice.

To establish whether it is worth utilising manipulatives in mathematics classrooms, we compared classes using manipulatives to classes that did not. One-variable linear equations in third- to sixth-grade classes were used as a case study for our investigation because this important concept in algebra has usually been taught merely in terms of rules and procedures, rather than focusing on the concepts contributing to those rules (Magruder 2012, 13; NRC 2001, 259). This

chapter attempts to use the studied context to resolve the disagreement over the use of manipulatives in practice. First, it reviews some of the proposed reasons that manipulatives may not be beneficial, and could even be damaging to children's learning and achievement. It also reviews current suggestions for benefiting from manipulatives and relevant models. Second, it presents the context, methods, and results of our study. Finally, it discusses the observed benefits of manipulatives in the studied context, and then proposes evidence-based implications for research, practice, and policy.

Literature review

Research into the effectiveness of manipulatives has yielded varying results, suggesting that their use alone may not automatically facilitate learning within mathematics classes. While there have been many explanations as to why earlier research concluded that the use of manipulatives is ineffective, some of these explanations have actually reached the opposite conclusion. However, several of the proposed explanations do signal the same conclusion: that is, there are potential advantages of using manipulatives, but that they do have to be used appropriately and effectively. Two recommendations regarding how to benefit from manipulatives can be drawn from previous studies. First, manipulatives should be used for fostering children's conceptual understanding rather than for acquiring procedural fluency. Second, while interacting with manipulatives, children need to make a connection between different representations constructed through the manipulatives and mathematical symbols of the same concept. (e.g. McNeil and Jarvin 2007; NRC 2001; Uttal et al. 2013.)

According to the recommendations from previous studies, using manipulatives to facilitate linking various representations of mathematical concepts together can contribute to students' conceptual understanding. To date, various translation models of multiple representations in learning mathematical concepts have been recommended (e.g. Goldin and Shteingold 2001; Joutsenlahti and Kulju 2010; Lesh, Landau, and Hamilton 1983). Besides proposing different representations of mathematical concepts, they have emphasised that "representational fluency"—which has been defined as (a) the ability to represent to-be-learnt mathematical concepts in various forms, and (b) the ability to bridge these representations—plays an important role in facilitating children's understanding of mathematical concepts. Several other studies have supported this understanding (e.g. NRC 2001; Suh and Moyer 2007; Teck 2013).

Our research employed "languaging mathematics", one of the translation models proposed by Joutsenlahti and Rättyä (2015), to enhance students'

representational fluency while interacting with manipulatives. In this chapter, we refer to languaging mathematics as "languaging". The term languaging was previously introduced to didactic mathematics and second language learning in relation to verbal communication (see Bauersfeld 1995; Swain 2006). However, Joutsenlahti and Rättyä's (2015) concept of languaging goes further. They have defined languaging as an approach where a student expresses their own mathematical thinking by using one or more of the following four types of language: natural (verbal and written), pictorial, mathematical symbolic, or tactile language. Tactile language has been added to the current model so as to take account of mathematical thinking occurring when interacting with hands-on materials (i.e. manipulatives). Languaging-based instruction has been studied at different educational levels (Joutsenlahti and Rättyä 2015, 51–53). Based on these studies, and those of other researchers (e.g. Bauersfeld 1995; Suh and Moyer 2007; Teck 2013), it has been demonstrated that languaging plays a crucial role in mathematics classrooms in three aspects: the development of students' conceptual understanding, co-operative learning, and the assessment of students' mathematical thinking and learning.

Recently, the new Finnish National Core Curriculum for Basic Education (first to ninth grades) has emphasised mathematical concepts understanding as one of the most important mathematical proficiencies the curriculum aims to develop among students. Concrete and experiential teaching and learning have been underlined as a key instructional method. Additionally, languaging-based class activities have been included in the curriculum. Students are encouraged to develop their mathematical thinking and present it to their classmates and teachers through concrete tools, spoken and written language, and drawings (FNBE 2015, 128, 234–35, 374).

Context and methods

To be able to decide whether the use of manipulatives should be adopted into practice, we used one-variable linear equations in third- to sixth-grade classes as the lens through which the benefits of manipulatives were investigated. We conducted cross-sectional case studies utilising a concurrent triangulation approach of mixed methods as a strategy of inquiry. Qualitative and quantitative data were collected from teachers and students and then integrated for data analysis in order to holistically combine the research findings.

Participants

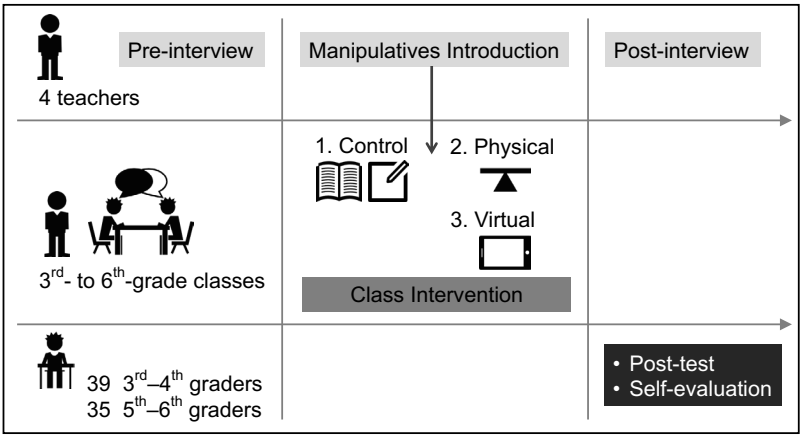
The study was conducted in one third-grade, one fourth-grade, one fifth-grade, and one sixth-grade class in a typical middle-size lower comprehensive school in southern Finland. This particular setting was selected as a case study for two reasons. First, schools and classes in Finland are homogeneous in terms of the students' socioeconomic background and performance (FNBE 2012, 2, 14; OECD 2013, 5–6). Moreover, all permanently employed class teachers in Finnish schools are required to have the same qualifications, including a master's degree and continuing professional development (OECD 2013, 10–11). Consequently, the homogeneity of Finnish comprehensive schools and class teachers made it possible for us to conduct the research in any Finnish school. Second, with limited resources and time, we expected to achieve the most fruitful results by studying third- to sixth-grade classrooms, in which the use of manipulatives has usually declined (Marshall and Swan 2008, 344).

Four class teachers (teaching experience 6–21 years) and 74 students (ages 9–12, N_{3rd}=23, N_{4th}=16, N_{5th}=14, N_{6th}=21) from the school participated in the study. Teachers' pre-interviews revealed that none of them had ever used the manipulatives intended for this study. Due to the mathematics contents included in the previous and new National Core Curriculum (FNBE 2015, 236, 375), all teachers had limited experience in teaching equations. Moreover, the students had low prior experience and knowledge of the mathematical content used in this study. Third- and fourth-grade students had not received any formal instruction in equations, while fifth- and sixth-grade students had received some instruction in solving one-variable linear equations with trial-and-error substitution of values and reasoning for the unknown. It could therefore be claimed that the homogeneity of the participants helped ensure validity and credibility of conclusions to be drawn from the research results.

Procedures

Four separate studies utilising identical research methods and procedures were conducted in the participants' classrooms during regular school hours. The studies were grouped into two grade bands (third- to fourth-grade and fifth- to sixth-grade) according to their similarity of instructional and post-test materials. Each study consisted of the following: 1) teachers' pre- and post-interviews; 2) class intervention, including one control group (a languaging-based classroom without manipulatives) and two treatment groups (a languaging-based classroom with a physical or virtual manipulative); and 3) students' post-test and self-evaluation (Figure 9-1).

Figure 9-1. Mixed-method research design



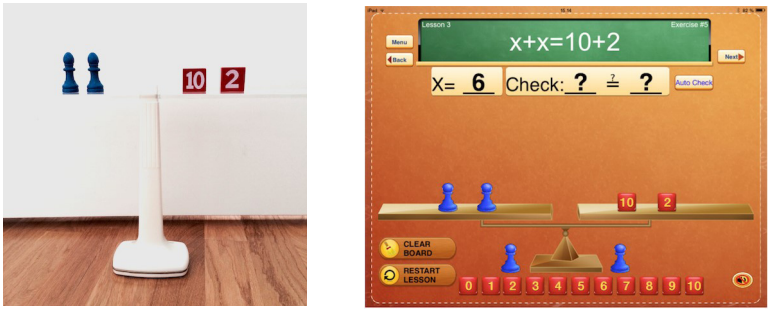
Teachers' interviews. The teachers participated in face-to-face semi-structured interviews before the treatment groups' lesson to illuminate any prior conceptions and experiences in teaching equations and utilising manipulatives which might affect the study. After all the class interventions, another interview was held to learn about their experiences, perceptions, and opinions about teaching and learning during the interventions.

Class interventions. Based on the students' prior mathematics performance during the academic year, each class teacher categorised them, within-class, into low, medium, and high attaining. They then assigned students from each category randomly, to either a control group or one of the two treatment groups. This was to ensure similarities between the instructional groups; that is, an equal number of students from each attaining level in all groups ($N_{control}$=25, $N_{physical}$=25, $N_{virtual}$=24). The same teacher taught the control and the treatment groups the same content for one 45–minute lesson. Before the study, each class teacher received instructional materials—a teacher guide and a student worksheet that were specially designed for the study to ensure conformity between the four studies. To avoid the influence of manipulatives on the control group's session, the manipulatives intended for the treatment groups' lesson were introduced to each teacher after the control group's lesson.

The lessons in all groups were almost identical. They each: 1) learnt the concepts of equivalence and unknown; 2) developed representational fluency through languaging—that is, translating and making connections between

various representations (verbal and written, pictorial, and mathematical symbolic) of equations; 3) solved equations; and 4) checked the solutions. The only difference was that the treatment groups utilised the provided manipulatives (tactile language) to accompany their lesson. According to our literature review, one drawback of previous research on physical and virtual manipulatives for equations is that the manipulatives used in the research differed from each other in several ways (e.g. Magruder 2012; Suh and Moyer 2007). Consequently, the various dissimilarities of the manipulatives make it difficult to compare the research results in terms of representational difference. Thus, this study utilised a physical and a virtual manipulative that shared the same concept and a similar operation for the treatment groups in order to minimise the effect of their other differing attributes on the research results. During the lesson, one of the treatment groups utilised Hands-On Equations® consisting of a balance scale, number cubes representing constants, and pawns representing variables, while another group utilised a virtual version of physical Hands-On Equations® for the iPad, Hands-On Equations 1 applet (Figure 9-2).

Figure 9-2. Hands-On Equations® and Hands-On Equations 1 applet



The instructional materials were divided into two sets, one for the third- and fourth-grade studies and another one for the fifth- and sixth-grade studies. There were only two differences between the two sets. First, the third- and fourth-grade lessons addressed equations with a pictorial unknown and solving equations by trial-and-error substituting values and reasoning for the unknown, whereas the fifth- and sixth-grade lessons addressed equations with a letter as an unknown and equations solving by performing the same operation on both sides of the equation. Second, the number values used in the fifth- and sixth-grade lessons required more arithmetic skills than the ones used in the third- and fourth-grade lessons.

Students' post-tests and self-evaluations. After the class interventions, all students completed the same 45–minute post-test with no access to the manipulatives. The test was administered to determine the relative difference in students' learning achievement across instructional conditions. Two post-tests (one for all third and fourth graders and another one for all fifth and sixth graders) were designed in a similar way to the class intervention worksheets. Each post-test contained six open-response test items requiring students to: 1) translate six equations presented through different representations (written, pictorial, or mathematical symbolic) into two other representations; 2) solve the value of unknowns; and 3) algebraically check their solutions (Figure 9-3). Furthermore, the third and fourth graders had to explain the strategies they used to find the unknown's value, while the fifth and sixth graders had to write down their steps of solving equations. After completing the post-test, students evaluated their learning experiences and achievement.

Figure 9-3. Three types of fifth- and sixth-grade post-test items

1. Visualize the equation below on the balance scale. Explain the equation in your own words. Solve and check the equation. Provide the steps of your solution.
   $x + 7 = 4 \bullet 8$

   The equation means that
   Solution:

   $x =$
   Check:

2. Explain the picture below in your own words. Represent the picture with mathematical equation. Solve and check the equation. Provide the steps of your solution.

   Equation:
   Solution:

   One pineapple weighs kg
   Check:

3. Visualize the word problem below on the balance scale. Represent the word problem with mathematical equation. Solve and check the equation. Provide the steps of your solution.
   When a mother is weighing ingredients for her cake, she notices that three eggs weigh as much as 20 g of butter and 25 g of flour together.

   Equation:
   Solution:

   One egg weighs g
   Check:

Results and discussion

Quantitative data from the post-tests and self-evaluations of students in both grade bands were used to statistically determine whether languaging-based learning with physical or virtual manipulatives enhanced the students' understanding of equation concepts compared with the control groups. Additionally, qualitative data from the teachers' pre- and post- interviews, along with the classroom intervention observations, were concurrently utilised to develop empirical understanding of the research results. Subsequently, all the data was integrated and then interpreted to cross-validate the findings. To address the question of whether manipulatives should be adopted into practice, we next provide and discuss our findings according to our research methods (i.e. students' post-tests and self-evaluations, teachers' pre- and post-interviews, and class intervention observations) before finally turning to our convergent research results.

Students' post-tests

To determine the impact of each instructional condition on students' learning, we examined students' post-tests across three instructional conditions in both grade bands ($N_{3rd\text{-}4th}$=39, and $N_{5th\text{-}6th}$=35). Overall, both manipulative groups of both grade bands out-performed the control groups on the post-test (Figures 9–4 and 9–5). The third- and fourth-grade physical manipulative groups had the highest post-test average scores (Mean=17.7 out of 24, SD=4.0), followed by the virtual manipulative (Mean=15.9, SD=5.5) and the control groups (Mean=13.6, SD=5.0). Similarly, the fifth- and sixth-grade physical manipulative groups performed better on the post-test (Mean=17.5 out of 30, SD=9.9) than the virtual manipulative (Mean=16.0, SD=9.7) and the control groups (Mean=15.5, SD=8.5).

To test the null hypothesis for the difference of post-test scores across instructional conditions, we examined 95% confidence intervals for the means. We found overlaps of confidence intervals (Mean±1.96 SE) across instructional conditions of both grade bands (see error bars in Figures 9–4 and 9–5). Therefore, we further investigated the test statistic for the difference between two means. We found a significant difference at the 5% level between post-test average scores only in third- and fourth-grade physical manipulative and control groups, that is, the 95% confidence interval for the difference between the means of these two groups (0.6, 7.6) did not contain zero.

The findings from students' post-test average total scores indicate that students in all instructional conditions of both grade bands learned to represent and translate equations into different representations, solve one-variable linear equations, and check the solutions. Nevertheless, the third- and fourth-grade physical manipulative group significantly outperformed the control group on the post-test. When comparing post-test performance by grade band, fifth- and sixth-grade performance was lower than third- and fourth-grade performance. A possible explanation for this might be that the fifth- and sixth-grade content was more challenging than the third- and fourth-grade content. In fact, according to the Finnish National Core Curriculum for Basic Education 2014, the content taught in the fifth- and sixth-grade studies is taught in seventh to ninth grades (FNBE 2015, 236, 375). Based on fifth and sixth graders' post-test response, there is evidence of their equation concepts understanding. A fair number of them showed that they used mathematical operations taught during the intervention for solving equations and were able to arrive at the correct solutions. However, they did not receive full scores because of their incomplete steps of solving equations or arithmetic mistakes.

Figure 9-4. Third- and fourth-grade post-test average total scores (out of 24) by instructional condition (error bars = ± 1.96 SE)

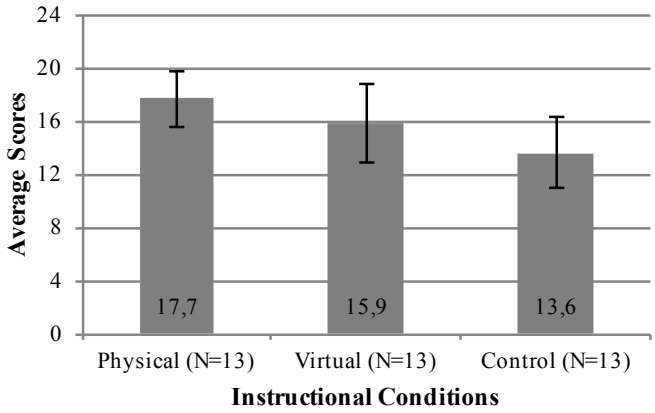
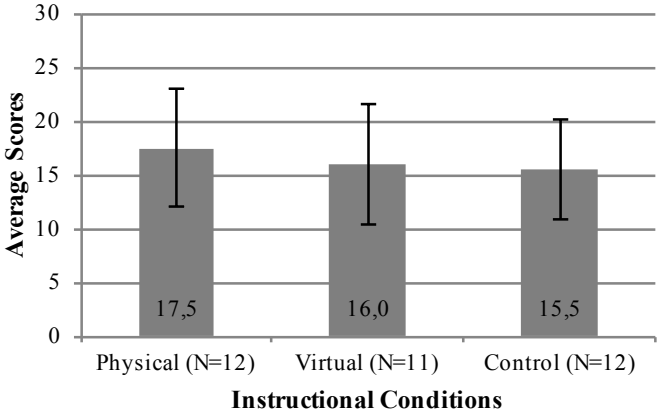


Figure 9-5. Fifth- and sixth-grade post-test average total scores (out of 30) by instructional condition (error bars = ± 1.96 SE)

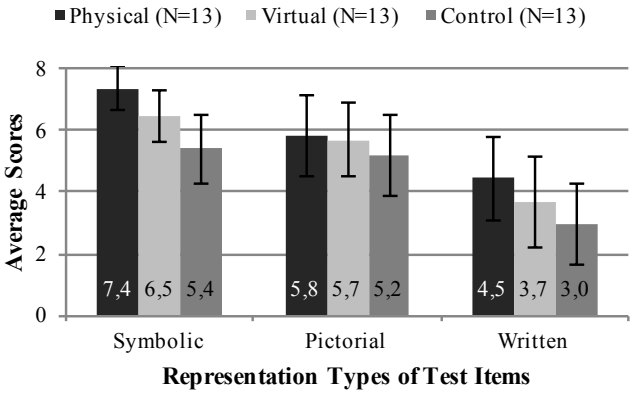


In addition, we also investigated students' post-tests in three separate sections of different representation types (mathematical symbolic, pictorial, and written) to identify the influence of each instructional condition on students' performance within each post-test section. Figure 9-6 shows that the third- and fourth-grade physical manipulative groups performed best in all eight-full-score sections (Symbolic: Mean=7.4, SD=1.3; Pictorial: Mean=5.8, SD=2.4; Written: Mean=4.5, SD=2.5), relative to the virtual manipulative (Symbolic: Mean=6.5, SD=1.6; Pictorial: Mean=5.7, SD=2.2; Written: Mean=3.7, SD=2.8) and the control groups (Symbolic: Mean=5.4, SD=2.0; Pictorial: Mean=5.2, SD=2.4; Written: Mean=3.0, SD=2.4). As shown in Figure 9-7, even though the fifth- and sixth-grade physical manipulative groups did not perform best in every ten-full-score section, they performed consistently in all test sections (Symbolic: Mean=5.7, SD=2.5; Pictorial: Mean=5.9, SD=3.8; Written: Mean=5.9, SD=4.3), and better than the virtual manipulative (Symbolic: Mean=5.9, SD=2.1; Pictorial: Mean=5.5, SD=3.9; Written: Mean=4.6, SD=4.4) and the control groups (Symbolic: Mean=4.1, SD=3.5; Pictorial: Mean=5.9, SD=2.9; Written: Mean=5.5, SD=4.0).

Our findings from the students' performance in different sections of the post-tests are mostly in agreement with the post-test average total scores. The third- and fourth-grade physical and virtual manipulative groups performed better than the control groups in all test sections. However, the difference in

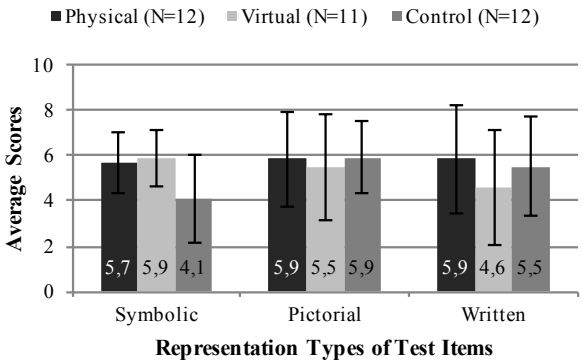
the fifth- and sixth-grade post-test performance across test sections was mixed. Although the fifth- and sixth-grade physical manipulative groups' performance in the symbolic section was lower than the virtual manipulative groups', overall, their performance was consistently close to 60% correct in all test sections. In contrast, the virtual manipulative and control groups' performance was inconsistent across test sections.

Figure 9-6. Third- and fourth-grade post-test average scores (out of 8) by representation type of test items across instructional conditions (error bars = ± 1.96 SE)



To discover whether instructional conditions influenced equations-solving strategies on the post-test, we investigated the students' post-test written solutions in terms of their strategies used for solving equations correctly. Their solutions were coded as: 1) trial-and-error substitution of values; 2) reasoning for the unknown; 3) mathematical operations (arithmetic and algebraic); and 4) other strategies. The "other strategies" code was used when students arrived at the correct answer without providing any explanation or steps for solving the equation, or when we were not able to identify their use of strategies. Our analysis did not include the situation where students did not solve the equation or solved the equation but did not arrive at the correct answer. Figure 9-8 shows that third and fourth graders solved 195 equations ($N_{physical}$=68, $N_{virtual}$=65, $N_{control}$=62) correctly by using mostly reasoning for the unknown (50.0% of physical, 55.4% of virtual, and 51.6% of control), followed by mathematical operations and trial-and-error substitution of values, respectively. As shown in Figure 9-9, fifth and sixth graders solved 139 equations ($N_{physical}$=50, $N_{virtual}$=44, $N_{control}$=45)

Figure 9-7. Fifth- and sixth-grade post-test average scores (out of 10) by representation type of test items across instructional conditions (error bars = ± 1.96 SE)



correctly by using strategies from three categories: reasoning for the unknown, mathematical operations, and other strategies. They were more likely to use mathematical operations (80.0% of physical, 79.6% of virtual, and 66.7% of control) than reasoning for the unknown or other strategies.

Our analysis of students' use of strategies to solve equations correctly reveals two main findings. First, in each grade band, the use of strategies for solving equations correctly did not differ overall between instructional conditions. Second, students in all conditions of both grade bands solved equations correctly by using mostly the strategies emphasised during the interventions (reasoning for the unknown in the third- and fourth-grade studies and mathematical operations in the fifth- and sixth-grade studies). Although we found no differences in the strategies used for solving equations correctly across the instructional conditions of each grade band, there was another potentially meaningful difference: On the third- and fourth-grade post-test, mathematical operations (which were never formally taught to third and fourth graders) were slightly more likely to be used for solving equations correctly by the physical manipulative groups than by the two other groups (Figure 9-8). Moreover, three-fifths (8/13) of the physical manipulative groups used this strategy to solve equations correctly at least once, whereas only half (7/13) of the control and one-thirds (4/13) of the virtual manipulative groups did. Likewise, on the fifth- and sixth-grade post-test, the physical and virtual manipulative groups were more likely to use mathematical operations taught during the intervention for solving equations correctly than the control groups (Figure 9-9).

Figure 9-8. Third- and fourth-grade percentage use of different strategies to solve equations correctly (out of 195) by instructional condition

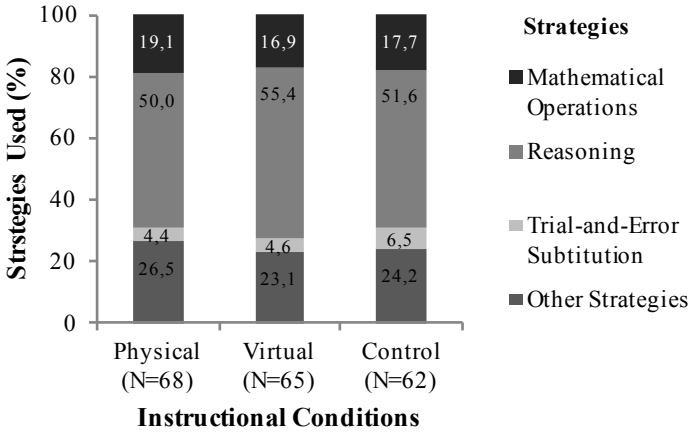
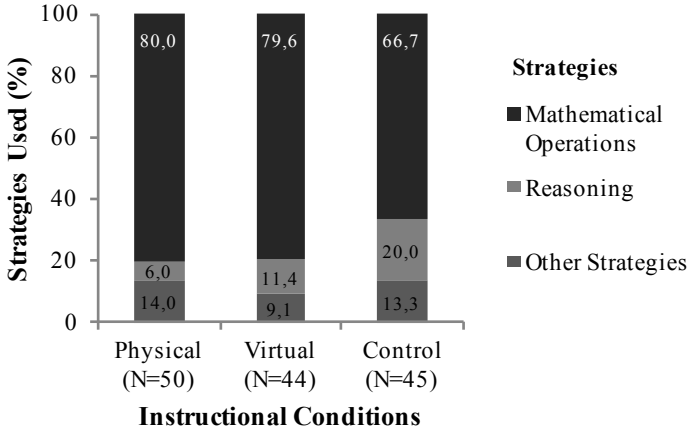


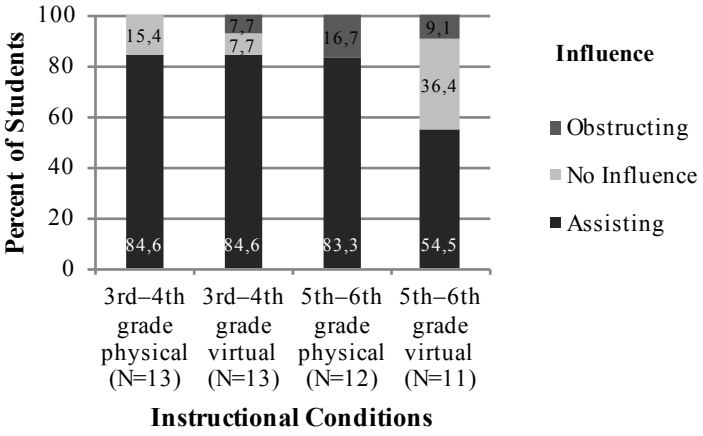
Figure 9-9. Fifth- and sixth-grade percentage use of different strategies to solve equations correctly (out of 139) by instructional condition



Students' self-evaluations

To crosscheck, against their post-test performance, how students assessed their equations learning development, we also concurrently examined their self-evaluation. In terms of learning development, students' self-evaluations generally support their post-test results. Three-fourths (10/13) of third- and fourth-graders in the physical manipulative groups considered themselves better at solving equations after the intervention, whereas less than half of the students in the other two groups (4/13 of virtual and 6/13 of control) considered that they had improved in this regard. Interestingly, although the virtual manipulative groups outperformed the control groups on the post-test, only one-third of them believed that their learning had improved, whereas the majority of them (9/13) considered that their learning had not improved. On the other hand, almost an equal portion of fifth and sixth graders across all three instructional conditions considered that their equations-solving performance had developed (6/12 of control, 7/12 of physical and 6/11 of virtual).

Figure 9-10. Percentage of students' opinions on the influence of manipulatives on their learning by grade band across instructional conditions



Next, we analysed the students' evaluation of the influence of manipulatives on their learning across instructional conditions and grade bands. Figure 9-10 shows that the majority of students in both treatment groups of both grade bands (third and fourth grades: 11/13 of physical and 11/13 of virtual; fifth and sixth grades: 10/12 of physical and 6/11 of virtual) thought that the manipulatives

assisted them in learning equations. The results of the students' evaluation correspond to our findings from the post-tests and suggest that manipulatives assisted students in learning equations.

Teachers' pre- and post-interviews

We analysed teachers' pre- and post-interviews to ascertain their viewpoint on how different instructional conditions affected students' learning of equations. After the class interventions, all teachers regarded their physical manipulative group lesson as the most successful. They reasoned that the physical manipulative provided students with a concrete and tactile learning experience and also facilitated students' individual and group languaging. In their opinion, when physically handling the manipulative, students concretely constructed conceptual understanding of: 1) equation equivalence through the balance scale; 2) constants and variables through their distinct representations (number cubes and pawns); and 3) performing the same operation on both sides of the equation through actual action of removing the same elements from both sides of the balance scale. Thus, the physical manipulative groups had a better understanding of equation concepts compared to the other groups. They also believed that students in these groups would perform best on the post-test. Actually, during the pre-interviews, the fifth- and sixth-grade teachers regarded manipulatives as beneficial learning tools for younger students (who are likely to construct their understanding of new concepts through concrete experiences). Nevertheless, after the interventions, the sixth-grade teacher admitted that manipulatives could actually also assist older students (who are likely to have the capability for abstract thinking) in understanding more difficult concepts, such as equations. Moreover, the third- and sixth-grade teachers mentioned that learning how to use the physical manipulative did not take as much of their instructional time as they had expected. Rather, the physical manipulative was straight-forward and generally enabled students to learn and complete the exercise more rapidly than students in the two other groups. This finding agrees with Martin, Svihla, and Smith's findings (2012, 1), but differs from Magruder's (2012, 96).

While the physical manipulative was unanimously regarded as the most successful lesson, the teachers had mixed opinions as to which lesson should be ranked second. The third- and fourth-grade teachers considered their virtual manipulative lesson as the second best and their control lesson as the third best, whereas the fifth- and sixth-grade teachers were not confident about the second and third ranks. Both teachers mentioned that although even low-attaining students in the virtual manipulative groups were able to arrive at the correct solutions to equations during the lessons, they tended to only scroll and try different

values for the unknown until arriving at a correct solution rather than developing their understanding. Therefore, these students might not actually understand the equation concepts and would thus perform worse than the control groups on the post-test. Apparently, the teachers' opinions regarding the students' learning achievement correspond to our findings from students' post-tests and self-evaluations. The physical manipulative seems to have had a positive influence on students in both grade bands, whereas the virtual manipulative had noticeable positive benefits only for third- and fourth-graders and appeared to function as an impediment to the development of fifth- and sixth-graders' equation concepts understanding.

Class intervention observations

We analysed the class intervention observations to find empirical evidence for convergent analysis. According to the observations, students in all instructional groups of both grade bands were able to represent the equivalence of the equations in various forms, solve equations, and check their solutions by themselves or with the assistance of their classmates or teachers. Nevertheless, the manipulative groups tended to work more independently, with minimal assistance from the teachers compared with the control groups.

Additionally, we found differences between the physical and virtual manipulatives. The physical manipulative groups had no difficulty in learning how to use the manipulative to model, solve, and check equations. They were more likely to work independently as well as co-operatively. When manipulating the physical manipulative, students usually said aloud (talking to themselves and their classmates) what they were doing or thinking. Consequently, they seemed to develop their understanding of equations gradually, through tactile, visual, and verbal languaging. Simultaneously, their classmates could also see and hear their mathematical thinking. Furthermore, the manipulative allowed the students to solve and check equations without strict procedure.

In contrast, the virtual manipulative was less likely to encourage verbal languaging and co-operative learning. Similar to previous research results (Moyer-Packenham et al. 2013, 36), the virtual manipulative groups tended to work silently and individually, especially when each student had their own iPad. They were more likely to hold the iPad for themselves instead of sharing. Consistent with Magruder's findings (2012, 101) and our teachers' interviews, a number of students seemed to manipulate the virtual manipulative by merely scrolling and trying until arriving at the correct solutions. Moreover, the applet's operational procedure appeared to be relatively complicated and inflexible.

Although students were able to model equations using the applet, several of them had difficulty in learning how to use it to solve and check equations. Consequently, some of them became confused and frustrated. Our findings from the class observations shows the benefits of the physical manipulative and demonstrates that the virtual manipulative functioned as a hindrance to the students' conceptual understanding, verbal languaging, and co-operative learning.

Discussion

Taken together, our convergent analyses demonstrate that students in languaging-based classrooms, across three instructional conditions, in both grade bands, learned to: 1) represent and translate equations into various forms (verbal and written, pictorial, and mathematical symbolic); 2) solve one-variable linear equations; and 3) check the solutions. These findings suggest that students in each instructional condition had developed their representational fluency, which indicated their understanding of equation concepts (NRC 2001, 119). As stated in the earlier literature review, the key to learning of mathematical concepts resides in assisting students in linking concrete and abstract symbolic representations of the same mathematical concepts. In this study, it was the languaging-based instruction that assisted students in classes, with or without manipulatives, in learning equation concepts.

In addition to languaging-based instruction, both manipulatives appeared to facilitate students' development of representational fluency and equation concepts understanding. Overall, both manipulative groups performed better than the control group on the post-tests, where no one had any access to manipulatives. This finding contradicts the claim, mentioned in previous studies, that students tend to over-rely on manipulatives without making connections to the mathematical concepts represented (Magruder 2012, 101; Uttal et al. 2013, 6). Furthermore, we found evidence that the physical manipulative-based instruction is superior to the two other instructional conditions for improving students understading of equation concepts. Students in the physical manipulative groups outperformed their classmates on the post-tests. Likewise, our findings from the students' self-evaluations, the teachers' interviews, and the classroom observations also reveal the positive impact of the physical manipulative on students' conceptual understanding, languaging, and co-operative learning. These findings—on the superiority of the physical manipulative over the virtual manipulative—do not support the previous studies that reported that virtual manipulatives are as beneficial as physical manipulatives to mathematics learning (Moyer-Packenham et al. 2013, 37; Suh and Moyer 2007, 156). This contradictory result may be

because, in our study, a number of students manipulated the virtual manipulative in a rote procedural manner to get the correct solutions. Moreover, students were less likely to verbalise their mathematical thinking. These two factors may have negatively affected students' understanding of equation concepts.

In summary, the evidence from this study suggests that when making a connection between various representations constructed through manipulatives and mathematical symbols of the same concept, manipulative-based instruction is more likely to promote students' mathematical concepts understanding. This is consistent with previous research results (Suh and Moyer 2007; Teck 2013). Additionally, our findings support those of other studies in which manipulatives appear to assist students of any age (at any cognitive development level) in developing their understanding of new concepts (McNeil and Uttal 2009, 138).

The presented research results need to be interpreted with caution however, due to some of the inherent limitations—the most obvious of which being the nature of this research as an empirical study conducted in the real contexts of the classroom rather than a laboratory environment. However, the results of research conducted in an authentic teaching and learning context may have provided a better understanding of the real world compared with the findings of research carried out in a laboratory environment. Second, in spite of the teachers' similar qualifications, their different backgrounds and experience as well as their freedom to adjust their lessons may have affected the research results. However, we believe that this had no critical influence on our findings because in each classroom the same teacher taught the same content under all of the instructional conditions. Third, teachers and students may have acted unusually when being observed and video-recorded. Nonetheless, being in a familiar environment (one's own classroom) would likely help them to act more naturally. Fourth, the explanation on the post-test instructions and the encouragement provided during the tests may have had some influence on the students' post-test performance. Still, the explanation and encouragement were, in fact, necessary for students to gain a toehold because the test items were distinctly different from normal school tests and some students became nervous about taking a test after one 45–minute lesson. Fifth, because there was no pre-test before the class interventions, one could argue that the post-test results may have been skewed by the differences in the students' prior mathematics performance levels. However, each class teacher randomly assigned an equal number of students with different prior mathematics performance to each instructional group and so the concern regarding skewed post-test results could be ruled out. Lastly, when conducting cross-sectional case studies, a trade-off between breadth and depth of the study is an unavoidable issue. Due to our limited resources and time as well as the school's constraints

(e.g. the number of students per class per teacher), the sample size was rather small and the duration of each class intervention was relatively short. As a result, it is difficult to extend these research findings to other educational contexts.

Conclusion and implications

Our research results highlight the benefits of manipulatives in classrooms for mathematical concepts understanding. These research findings not only provide implications for practice but also for policy-making and future research.

Regarding the question of whether manipulatives should be adopted into practice: our findings support the recommendations, mentioned in our literature review, regarding how to benefit from manipulatives; We recommend that manipulatives be used for facilitating students' understanding of new mathematical concepts. Additionally, manipulatives should be used to assist students in developing their representational fluency (i.e. making a connection between concrete representations constructed through the manipulatives and mathematical symbols of the to-be-learnt concepts) through languaging.

Two implications for policy can be drawn from the presented research results. Our first recommendation resonates with the mathematics instruction objectives of the Finnish National Core Curriculum for Basic Education (FNBE 2015, 128, 235): mathematics curricula should encourage instruction utilising manipulatives in collaboration with languaging to enhance students' representational fluency, which leads to their understanding of mathematical concepts. Our second recommendation is that teacher training should prepare pre- and in-service teachers to effectively benefit from manipulatives.

Despite the fact that this research provides valuable insights into the benefits of manipulatives in classrooms for equation concepts understanding, the limitations of this research make it difficult to generalise our findings to other classroom settings. Therefore, future studies should: investigate larger sample sizes, employ a longer period of class intervention, and add pre- and delay-tests to the research design. During the post-interviews, three out of four teachers mentioned that they plan to use both physical and virtual manipulatives to teach equations in the future. Therefore, it would be valuable to add another treatment group using physical and virtual manipulatives to further research on this topic. Furthermore, to better understand how the mathematics classroom can fully benefit from manipulatives, future research should consider investigating the benefits of manipulatives for diverse learners, different educational levels, and other mathematics content.

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Part III: Poetic Language

CHAPTER TEN

FROM POETRY TO POETIC SHORT FILM: TRANSDUCTION IN DANISH MOTHER TONGUE EDUCATION

Raffaele Brahe-Orlandi and Ove Nielsen

Introduction

In this intervention study, we aim to point out some of the potentials and problems, as we found them, in relation to didactical designs around the concept of transduction with the use of as tools. Our primary focus—apart from the tested design—is on the students learning, and not on the teacher's role. This does not mean that teachers (e.g. Priestley, Biesta, and Robinson 2015) and other contextual factors—such as the use of ICT—are not important. We chose however to focus on students learning, and in particular signs of their learning, during a course where they transduce meaning from written lyrical texts through short poetic film.

The research questions underlying this study are:

1. How do students transduce their interpretation of poetry into decisions on the creation of new texts through other forms of representation and media?

2. Moreover, which signs of their learning is it possible to identify during an intervention with a didactical design aiming at students understanding of poetic texts, their competencies regarding text interpretation, and transduction as well as their multimodal texts competencies?

The overall purpose of the chapter, the underlying research, and its findings is: 1) to contribute to the development of research-based mother tongue subject didactics; and 2) to point out potentials, in the form of adequate student learning, when working with student centered, ICT-supported, and action oriented didactical designs.

Towards these ends, we collaborated with teachers from a public school in Aarhus to develop a didactical design that then was tested in two classes with students aged 13–15. The common interest of researchers and teachers was to

discover more about how students can work creatively with ICT as an accelerator in a (for the students) meaningful way, where they also achieve the subject's formal goals and gain a deep understanding of the substance (Fullan and Langworthy 2014; Johnson et al. 2015). Behind this formulation lies the assumption that too often students work with ICT-based learning products in which their work is more or less decoupled from the curriculum and formal goals (Cuban 2001).

This chapter begins with a description of the research methodology including research design, methods for data collection, and a description of the didactical design developed and tested during the intervention. This is followed by an introduction to the theoretical concepts relevant for the didactical design as well as for the coding and analysis of the data collected during the research intervention. Thereafter follows an analysis of some of the significant findings in our empirical material. We reflect on these findings and suggest some design principles with regard to didactical designs centred on interpretation and transduction in mother tongue language education. The chapter ends with a conclusion and a discussion of the implications of the study for future research, practices, and policies.

Research methodology

The research is organized around the principles of Design Based Research (DBR) (Barab 2006, Barab and Squire 2004; Misfeldt et al 2011). A key principle of DBR is producing knowledge through the iterative development, testing, and improvement of an educational design. This is done in collaboration with stakeholders in practice—in this case, two teachers and their respective students.

In line with other interventionist methods, e.g. action research (Nielsen and Nielsen 2010) and ethnographic field studies, (Hastrup 2010) the research is carried out in a specific practice with specific practitioners, whose role is both the role of collaborators and objectives for the study. In contrast to e.g. action research, it was we, the researchers, who came with a rather predefined idea of what we wanted to explore, and how we wanted to explore it. The specific teachers' needs in *their* specific practice were not the starting point for the research.

Research design

The research design divides into three main phases: 1) Pre-intervention, 2) Intervention and, 3) Post-intervention:

"The pre-intervention phase" consisted of planning activities. We (the researchers) discussed our mutual interests in students learning from two different angles—one of us having a background in general didactics and one in Danish subject didactics. We chose an overall methodology to work within (DBR), and we developed the didactical design to be tested. In addition, we contacted schools and teachers in order to find suitable settings for the study. We chose an average public city school with students from diverse social and ethnic backgrounds.

During "the intervention-phase", our position as researchers shifted between "participant-as-observer" and "observer-as-participant" (Gold 1958, 221)[1]. During the first part of the intervention, we met with the participating teachers for three design work-shops stretched out over a period of three months. Here we played a very active role as primarily participants, and secondly observers. The workshops had two aims. First, we had to make sure that the teachers understood what we wanted them to do and say during the actual testing of the design. Therefore, we presented them with a design that had clear descriptions of goals, contentareas, and a plan of action. Second, we wanted the teachers to align themselves with our ideas as much as possible. Therefore, we had to motivate them and give them a chance to influence how the design would eventually look. For example, the teachers had a big influence on which poems the students should interpret and transduce into short films. In general, it became clear, that the teachers, due to their knowledge about their students, had some important suggestions for improvements of the design.

The actual testing of the design took place over a period of three weeks, with seven Danish lessons a week. During this period, our role as "observer-as-participant" was foregrounded. We primarily observed what was going on, although we sometimes interfered by talking to students working in groups, guiding them according to the learning goals and by guiding the teachers before and after lessons.

For the observation and collection of data, we used a combination of methods. Video observation: We put up a digital camcorder in the classrooms, moving it in order to capture interesting issues in relation to research questions. In addition, we used our cell phone cameras ad hoc. Field notes: we took written notes

while observing teaching. Notes consist partly of descriptions of the observed teaching and of interpretive comments. Sound recordings: we made sound recordings of various student groups' conversations during the course—especially conversations where students interpret poems and work on transducing the meaning of the poem.

In "the post-intervention phase" we coded, analyzed, and discussed our empirical material. The empirical material appeared to be overwhelming in its volume, and—due to limited resources—we contended with only taking into consideration significant findings directly connected to our research question. In the light of our analysis, we refined the didactical design, taking into account our findings.

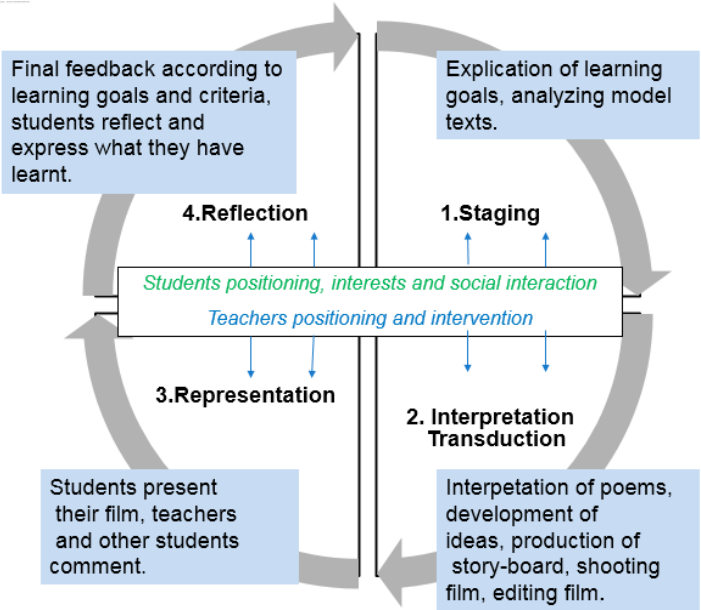
The tested didactical design

The design is based on a model (Figure 10-1) we created, inspired by Kress and Selander's model for formally framed learning sequences (Kress and Selander 2012, 99) and Kolb's learning cycle (Kolb 1983). It is divided into four phases. We consider phase graduation an analytical division. In practice, there will be overlap between the phases. We believe, however, that the phase division may make it easier for teachers to use the model in planning.

The model is circular, due to a consideration of learning being a process, and the emphasis on iterations (Kolb 1983). A lesson will not necessarily always end with all students having learned the goals of the course. Learning goals are therefore often included again in new customized courses. Below we shortly describe the didactical design based on the model:

In the center of Figure 10-1, we position students and teachers, who are the actors in any teaching and learning setting. We consider students' ways of positioning themselves, their interests and their social interactions to have a great influence on what happens through the course of the design. At the same time, it matters in what ways teachers intervene and how they position themselves during the course of the design. As mentioned in the introduction, we chose to focus especially on the students learning, so in this study we put our main attention towards students.

Figure 10-1. Model for didactical designs around transduction



Staging

Teaching starts by awakening students' engagement and motivation to learn new things. In the design, teachers introduced poetry as a genre, pointing out examples from the students own life world, e.g. song-texts. Afterwards they showed the students an example of a professionally produced poetic short film, created as a transduction with a poem as starting point. Teachers and students had a conversation about what constitutes poetic films, as opposed to narrative/action based films. In addition, teachers introduced the goals of the course:

- Gain knowledge about lyrical texts (with certain stylistic characteristics)
- Gain competencies to interpret poems and transduce their meaning into poetic films
- Gain competencies to produce multimodal texts

- Gain the ability to argue choices when transducing from poem to film based on text interpretation

Presenting and discussing learning objectives in this phase of the process does not mean that they are not important in the other phases of the design. Students must maintain a focus on goals throughout the whole process.

Transduction

In Phase 2, students work with a mix of interpretation and transduction. Through joint reading and interpretation in groups of four, students identify the poem's meaning. Parallel to this, the initial transduction takes place. The students' conversations and discussions lead into a concept development phase.

In this phase, the teacher initiates various exercises: For example, students record their own readings of the poem with a digital audio recorder. Walking in the local area, students listen to the recording while perceiving sights, sounds, smells and feelings. Afterward students discuss their perceptions during the walk and their potential inspiration, moods, and ideas.

Such exercises lead to the preparation of a script and a story-board, which then become the starting point for the production of the short poetic films by the groups of students. The students' films had to respond to the following guidelines:

- The meaning of the poem must be recreated in the film
- A reading of the poem must be included
- The films length should not exceed 3 minutes
- Background music must be added to some extent
- Humans appearing in the film are not allowed to say anything

Representation

In phase three of the didactical design, students showed and orally presented their films to the other students and teachers. The presentations should contain reflections related to learning goals: E.g. why does the film look and sound the way it does? What kind of decisions are underlying the shaping of the film?

Reflection

The reflection phase of the didactic design consists of both an assessment of students' understanding and competencies in relation to the stated learning goals and a reflection on the learning that has / has not occurred. It is important to maintain and describe student learning in this phase, so that both students and teachers have evidence of student's learning standpoint, which is the impetus for new didactic designs (cf. the circular model). One way for teachers and students to maintain this learning is a simple chart (cf. Figure 10-2) showing criteria for the learning product. The teacher writes a comment in one of the boxes (above average, competent, under developing or initial stage), and thereby rates the students work and at the same time explains and gives reasons for her rating. This type of assessment can both serve as feedback and feed-forward (Hattie 2013) directed to the student's future opportunities to work with the goals.

Figure 10-2. Assessment chart based on criteria for the learning product

Criteria	Above average	Competent	Under developing	Initial stage
Main idea: The meaning of the poem is recreated in the film				
Functional specialization: Relevant use of images, voice as sound and music.				
Working with lyrical/metaphoric shaping of meaning				
Etc.				

The criteria in the chart (Figure 10-2) is connect to the previously specified learning goals of the course. A competent fulfillment of the first criteria relates to the students work with interpreting the poem and their ability to transduce the meaning of the poem into film. The second criteria has to do with students work producing multimodal texts, in the shape of poetic short films. The third criteria points to the students understanding of poetic texts.

Theoretical concepts

Below we elaborate relevant theoretical concepts related to the learning goals in the didactical design described above, followed by our (the researchers) analysis of the empirical material collected during the intervention.

Interpretation

In the study, we draw upon reader-oriented theory on interpretation of texts (Iser 1978; Eco 1984; Hansen 2004). When the students meet the poems in the didactical design, they work on their interpretation by reading the poem several times in different ways. Interpretation becomes a process in which the meaning of the poems gradually unfolds as the students read and discuss the poems' form and content. "Theoretically" speaking, they fill in the blanks (Iser 1978) as they go along. The text itself leaves the reader with a structure, certain words put together in a certain way pointing to a certain theme and a certain mood. Those texts' internal elements always leave gaps or blanks for the reader to fill in. "Pedagogically", the task is to find ways that students can connect to the texts' internal elements by reading closely and at the same time filling in the blanks by activating their own feelings and understandings of the world. In that way, the meaning of a text is always to be found in the process of reading—in a co-production between the text itself and the active readers work with it (Hansen, 2004).

Lyrical texts

Lyrical texts are—due to their short and experimental form—open for different interpretations (Hejlsted 2012; Mailand 2007); They leave more blanks to fill than other types of texts. In the present study, we emphasize differences between lyrical texts and narrative texts (Mailand 2007). Students should gain an understanding of lyrical texts as opposed to narratives—texts structured around time and a plot. Lyrical texts express feelings and/or moods as they appear in the moment, and they do not necessarily refer to the real world. The stylistic tools

used in lyrical texts include different kinds of literary tropes, such as metaphors, and experimental use of language, regarding both syntax and semantics. Lyrical texts primarily refer to written texts such as poems and songtexts. However, other text types, using sound and moving pictures as representational forms, can function as lyrical texts too, e.g. the students' transductions in our intervention.

Learning through transduction

Transduction in this study connects directly to interpretation. It is in the extension of the interpretation that students transform the outcome of the interpretation—the meaning of the poem as they extracted it through their work—into a new expression. At the same time, transduction is a process of change in line with transformation; Transduction is the kind of transformation where new representations are created based on interpretations of a given expression (poems in our case), and where these new representations are created using other semiotic resources than those used in the original expression (Kress 2003; Selander and Kress 2012). In the didactic design tested through the intervention in the present study, students should thus transduce their interpretation of the selected poem into a new representation—the poetic short film. According to Kress, transduction is a deeper process of change than transformation, where the change takes place within the same forms of representation[2].

Consequently, the concept of "representation" is important. Representation refers to the student's "new" fixed and processed understanding of a phenomenon, and is thus an important indication of the student's learning, e.g. in the shape of a poetic film. Representation is hereby opposed to a "reproduction" in which students represent a learned content—mediated through teaching—unreflected. In the present study, we moreover chose the term "learning product"[3] for representations such as the students' short poetic films.

Transformation and transduction connect to a social semiotic understanding of learning (Kress 2003). Learning here is a sign-making activity, where the learner shapes his or her understanding of the subject using available forms of representation (eg. writing, speech, moving or fixed images, or audio). For Kress, learning and sign-making are more or less equated, because they are both expressions of a process where the learner changes his understanding of a given content area and thereby extends and refines his or her understanding of the world.

Multimodal text competencies

A qualified transduction of a poem requires multimodal text competencies (Løvland 2006; Gissel 2011). Students must be able to make informed choices wherein the written poem's meaning finds a new expression in a new representation constructed around other forms of representation. The process involves more precisely that meaning created through written words is transduced into a new representation by means of moving pictures, with voice as sound and music.

In order to do this, students must be aware of the affordances of the forms of representation in use (Kress 2003; Gissel 2011; Løvland 2006). Affordances point to the individual properties or particular strengths within the different forms of representation. A well-chosen piece of music can, for example, support the poetic film's mood and thereby help to qualify the product.

The production of a multimodal text (Løvland 2006) requires conscious choices about the text's composition and design. The different transparent layers of meaning within the text—voice as sound, music and moving images—should be woven together in such a way that the overall product emerges as an intentional learning product with a clear communicative purpose. There must be an appropriate functional specialization (Kress 2003; Løvland 2006) between representational forms and their function. For the text to become a coherent text, students therefore must know how words, images, and music can interact and subsequently deepen and/or expand (Van Leuwen 2005; Gissel 2011) the total meaning potential of the text.

Figure 10-3 gives an overview of five different ways in which representational forms respectively can deepen and/or expand each other. The examples derive from the students' work with transduction based on Yahia Hassan's poem "Plastic Flower" (Appendix 1).

Figure 10-3. Possible relations between the representational forms of music, voice as sound, and moving images (inspired by Gissel 2011)

Relations between voice as a sound (reading of the poem), music, and moving images		
Deepening	Illustration	The images can specify the reading of the poem. They then function as an illustration with respect to the verbally spoken text. For example, by filming a father who sleeps on a mattress on the floor (appendix A), students illustrate and thereby deepen the meaning of the verbal textual statements.
	Anchorage	The reading of the poem anchors the images to a more specific meaning. Choosing abstract images, which only show colors (e.g. a red-colored hand moving) while the reading provides information on a deliberately started fire in an apartment (appendix A), is an example where the words anchor the images in such a more specific meaning.
	Explanation/ description	Explanation is another form of deepening. Written or spoken words can explain images. Poetry is fundamentally more descriptive than explanatory, and therefore the term description as a deepening function is more relevant in this case.
Expansion	Supple-mentation	In order to expand the meaning of a verbal language statement one can add images. A concrete description of an event can be supplemented by images showing objects or people who do not immediately appear in the verbal language text. Music or other sound effects can supplement the verbal language text in the same way, for example, bits of Heavy Metal Music expand the meaning potential further.
	Contrast	Expansion of the meaning potential of multimodal texts can also happen through contrasting. Simultaneously with written words describing a dark mood, the images may consist of a light field of flowers on a summer's day, accompanied by classical string music in major keys. This would extend the meaning potential of the text by accentuating contrasts. The multimodal text thus becomes more open and ambiguous.

Analysis of the significant findings in the data

To answer the questions formulated in the introduction, we conducted a coding and an analysis of significant findings in the data material based on the research questions and the theoretical frame-work presented above. We started by identifying signs of students learning concerning:

1. Students' understanding of lyrical texts' form and function

2. Students' competencies in regard to text interpretation and transduction on the basis of their interpretation

3. Students' competencies in regard to production of multimodal texts

In the subsequent analysis, we primarily drew on hermeneutical methods (Gadamer 2007). We interpreted voice and video recordings focusing on students' understanding, their attitudes, and their values towards the desired learning goals, taking into consideration our own positions and understandings. In the same way, we reflected on the students' learning products—the short poetic films. We describe the findings from our analysis of the data in the following way:

1. Constructing illustrative descriptions of two exemplary observations from the empirical material including quotes from students

2. Based on these two descriptions and the broader analysis of the empirical material, drawing conclusions and pointing out design principles connected to our research focus

Figure 10-4. Stills from students' film

Observation 1: Working with transduction

A group of four students selected the poem "Plastic Flower" by Yahia Hassan (cf. appendix A). They read and discuss the poem, and their interpretation leads to understanding the poem as the main characters' showdown against his father. This symbolically culminates with the poem's narrator setting fire to a plastic flower. A dialogue in the group unfolds:

"We need to get hold of such a flower, and then film it, while it burns. It will be the final scene!"
"What about what happens before that? So one can understand why he does it?"

The group discusses how the process should be, and they try to outline the film's sequences using a storyboard. The final scene is in place, the task now is to imagine things that can lead toward climax. The group interprets the gloomy atmosphere in the poem and associates to typical effects from other movies:

"You only need to hear footsteps and see feet moving, that is enough!"

Eventually the group ends up with a dramaturgy outlined in the storyboard, accepted by the teacher as well. The group chose to use a nearby basement, which provides a suitable dark location for filming.

"How can we do what it says in the poem: 'I walked my guilty steps'? How should I walk?"
"You just try walking like a zombie!"

Students' understanding of lyrical texts' form and function

In the empirical material, students understanding of lyrical texts form and function primarily comes forward in their learning products, e.g. in observation two.

The majority of the films produced during the course are competent lyrical short films. Nevertheless, it becomes evident that the majority of students have difficulties pointing out the difference between action-based films and poetic films when they are asked to explain this difference in the evaluating session of the course. There seems to be a gap between what the students are able to do (produce poetic films) and what they can verbally express in a reflected way. Although, observation two shows that some of the students gained a deeper

understanding of lyrical texts' form and function, and were able to express their understanding.

Figure 10-5. Fragility expressed through a house of cards

Observation 2: presenting—and reflecting on—new representations

A group of students presents their film. The film shows close-ups of hands that slowly build up a house of cards. At the end, a hand removes one of the lower cards, causing the house to collapse. A single short clip shows a burned house. On the audio side, a reading of the poem follows the building of the card house, with a serious tone of voice, and added background music (a solo piano playing a slow, melancholic theme). The trembling of hands and the fragile construction create tension: When will the unavoidable happen: the collapsing of the house? One of the students' comments:

"We chose a house of cards because if you consider the lies and the insecurity in the family (in the poem), it will make family ties very unstable, like a house of cards. If one card is slightly tilted, it all falls apart."

"The fact that the flower is made of plastic, is also something false. We understand the poem in the way that the main character probably cannot face his early childhood again, once he has recognized how bad it was."

In general, the usage of relevant subject specific concepts in the students' discourse is absent when they work with producing the film. Instead, they use every-day vocabulary, e.g. in observation one. On the other hand, in the lessons where they had to analyze the original poems, in the beginning of the course, students used subject specific concepts relevant to poems, as voice recordings show. Students seem to draw a clear line between the initial interpretation of the poem and the transduction phase when it comes to using vocational concepts. This also becomes evident during the presentation session, where students were asked to give feedback to the other groups' films according to the criteria for a competent film. During that session, students generally commented on issues concerning either technical issues, such as the quality of the sound, or whether they felt entertained.

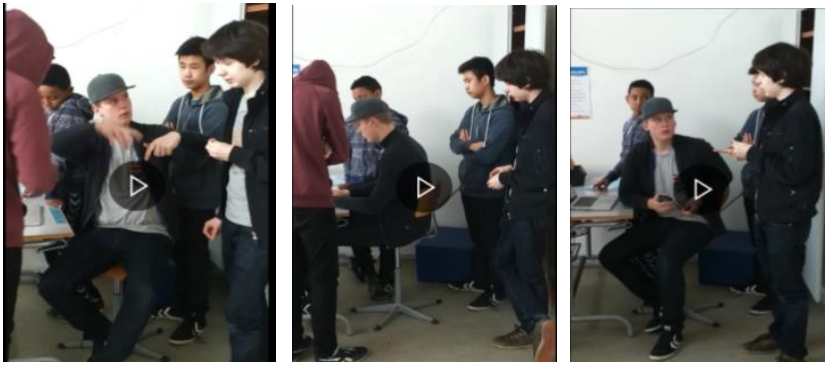
Students' competencies in regard to text interpretation and transduction

Although the group's work in observation one may seem impulsive and experimental, it shows how choices throughout the process have a common reference in the poem and its interpretation, and in the challenge to produce a film that must comply with certain rules and aesthetic choices. The students explicitly work with transduction when they discuss how to transform the verbally expressed metaphor "walking my guilty steps" into the multimodal language of poetic film. Doing so, they connect interpretation of the poem to the production of their own new representation through transduction.

Likewise, the group mentioned in observation two clearly sees parallels between the house of cards and the mood and situation expressed in the poem; It is an uncertain situation where the slighest irregularity can overturn it all at once, like a house of cards. The group has interpreted the poem's title, "Plastic Flower", as something related to the insecure atmosphere in the poem. Plastic flower is something false, which does not last, and when you set fire to it, everything burns down at once. A burnt down shack is included in the film to emphasize this.

When we looked for signs of students learning regarding interpretation and transduction we asked whether students regularly returned to the poem's text and their initial interpretation of it. We found big differences here. Some groups tended to abandon the poems as soon as they had made a plan for their film, and others (such as the groups in observation one and two) continued reflecting on whether their films were good transductions of the poem.

Figure 10-6. Group work



Students' multimodal text competencies

We observed signs of students learning connected to their multimodal text competencies both in the process of producing their films and in the actual learning products. Following the work of the group from observation two, (see Figure 10-6) we observed that the students eagerly discussed issues concerning representational forms and their functional specialization. Figure 10-6 shows the group discussing choices regarding the audio in the moment of the collapsing of the house of cards. We see that one of the students sits by the computer and edits the film, as he discusses the many choices with the others. In this way, all the members of the group are involved in the work, although some clearly play a more active role than others.

Looking at the same groups' film as a learning product (observation two), we found that the group succeeded in producing a competent multimodal text corresponding to the criteria set up by the teachers. A multimodal analysis of the film shows how the students have worked with the different representational forms they have used. We start by observing how other representational forms deepen and/ or expand the reading of the poem:

The visuals, showing the building and collapsing of the house of cards, functions as an expansion of the reading. They supplement the meaning of the spoken words with an extra layer. As spectators, we are asked to make connections between the words and a visual metaphor represented by the house of cards. Visuals of a burnt down shack function as an illustration of the spoken words, although they differ from the words in the poem which communicate a burning plastic flower. These visuals amplify the fearful and serious connotations connected to fires in buildings where people live. Finally, the background music, in the form of a melancholy piano, also functions to supplement the depressed mood in the poem.

Meanwhile, we found that the spoken words of the poem anchor and thereby deepen the meaning expressed through the visuals and the music. The visuals alone express meaning in a very abstract way, whereas the spoken words intervene a more specific meaning, about a family, a flat and so on (appendix A).

In general, we found—as it was the case with students' understanding of poetic texts—that most students succeeded in producing competent multimodal texts. However, we observed big differences when it came to the individual student's ability to reflect on their productions using subject relevant concepts.

Conclusion

This chapter investigates the learning—connected to an understanding of poems, competencies regarding interpretation and transduction, and multimodal text competencies—that takes place when the teacher stages a learning design for students in 8th Grade in which they transduce meaning from written lyrical texts through short poetic film.

Through an analysis of selected significant findings in the data, we conclude:

- The students, who have gained a deeper understanding of the poem's meaning, also have managed to produce a learning product that meets the learning goals set up in the staging phase of the didactic design.

- The tested didactical design implies a student-centered interpretation of poems, highly engaging and motivating students to work with interpretation and transduction.

- The tested didactical design should further emphasize the need for students' understanding concepts and their use of concepts connected to poetic texts and multimodality.

- One way of doing this could be to point out some central concepts which are to be returned to throughout the course, including during the assessment of students learning.

Limitations and implications for future research

The present study is limited in that it only focuses on a didactic design and signs of students learning during the testing of the design. As mentioned in the introduction, other important limiting factors include the teacher's role and the role of ICT. We also found a clear limitation in the fact that we did not sufficiently take into account the significance of different student's roles in group-work.

In the present study, there is evidence that by focusing on the student as a creative text producer, they can work towards curriculum related goals, under the right conditions. However, it also shows that it is difficult to ensure that this is true for all students. Further exploration of the different students' roles and learning achievements is needed, e.g. by testing their skills individually and by

paying more attention to their participation in collaborative learning processes in group-work (Lave and Wenger 2003).

Methodologically, the study is limited because DBR suggests a further development of the design and further iterations of the testing of the design. Design Based Research projects would be able to illuminate potentials and problems more thoroughly if they worked with greater volume, tested the design through several iterations, and paid closer attention to the other, previously mentioned, limiting factors.

Implications for practice and policies

In the curriculum for mother tongue education in Denmark, 1–10 grade, there are four main areas of competence: Interpretation, reading, text creation, and communication. At the same time, goal-oriented teaching and learning are highlighted across the curriculum (UVM 2013). The didactic design that was tested and analyzed in this project intends to develop students' interpretative skills and their skills to produce intended and coherent multimodal texts—competencies that are given high priority in the curriculum. The research project, with the results and the theory underlying it, can be a useful suggestion as to how the teacher can work goal-orientedly with the new curriculum in Denmark.

Appendix A

PLASTIKBLOMST

I DEN LEJLIGHED JEG BRÆNDTE NED
SPISTE VI ALTID PÅ GULVET
FAR SOV PÅ EN MADRAS I STUEN
DE AF MINE SØSKENDE SOM VAR FØDT
VAR FORDELT RUNDT I LEJLIGHEDEN
EN VED COMPUTEREN
EN KRAVLENDE PÅ GULVET OG EN HOS MOR I KØKKENET
HVIS DU BLIVER VED MED AT IRRITERE DINE SØSKENDE
BRÆNDER JEG DIG
SAGDE MOR OG HOLDT FARS LIGHTER OP
MEN DA HUN LAGDE DEN FRA SIG
KOM JEG HENDE I FORKØBET
JEG TOG LIGHTEREN I LOMMEN GIK MINE SKYLDIGE SKRIDT
SATTE MIG I HJØRNET MELLEM RADIATOREN OG SOFAEN
LOD FLAMMEN SNAVE PLASTIKSTILKEN
JEG SAD DER TIL JEG IKKE KUNNE SIDDE DER MERE
GIK LIDT VÆK OG KIGGEDE FØRST PÅ FLAMMERNE
SÅ PÅ FAR
OG TÆNKTE AT DET VAR BEDST AT LADE HAM SOVE
MEN SÅ KOM MOR SKRIGENDE IND
OG FAR VÅGNEDE LANGT FØR BØNNEN SKULLE BEDES

OG FLAMMERNE TOG FAT

OG FAR KRAVLEDE OP AD TRAPPERNE I UNDERBUKSER

BEHÅRET SOM EN GORILLA

ADVAREDE HAN ALLE TAMILERNE I OPGANGEN

VI GIK NED I KÆLDEREN OG VENTEDE PÅ BRANDVÆSNET

DET ENESTE VI FIK MED OVER I DEN NYE OPGANG

VAR DET SORTE FJERNSYN VI HAVDE ET PAR ÅR ENDNU

BAGSIDEN VAR SMELTET

OG DEN TIDLIGSTE BARNDOMS MINDER VAR BRÆNDT

JEG FORDELTE EN MASSE AVISER

TIL DET MESTE AF GULVET VAR DÆKKET

BETRAGTEDE ALLE DE ORD OG BILLEDER

TIL MADEN BLEV BRAGT IND

HVIS FAR FIK ØJE PÅ ORD SOM SEX ELLER PIK

ELLER ET BILLEDE AF EN LETPÅKLÆDT SKANDINAV

DER APPELLEREDE TIL EN VANTRO

REV HAN DET AF ELLLER VENDTE AVISEN OM

MEN NYTÅRSAFTEN SPISTE VI RUNDT OM ET BORD

DER VAR KETCHUP OG COLA OG KNIVE OG GAFLER

HAN GAV ET PAR FLADE HVIS STEMNINGEN BLEV FOR GOD

ELLERS SPISTE VI SÅ CIVILISERET

Notes

[1] Gold puts forth and reflects upon four types of participation in qualitative research; respectively "complete contender", "participant-as-observer", "observer-as-participant" and "complete observant" (Gold, 1958).

[2] In this chapter, the term "forms of representation" (Gissel 2011) is used to describe the different semiotic resources that can be used in order to create a text. Elsewhere the terms "modes" (Kress 2003), "modalities" (Løvland 2006) or "sign worlds" (Kress and Selander 2012) are used.

[3] The term is an elaboration of the term "knowledge product" (Gynther et al. 2010). By using "learning" instead of "knowledge" we distance ourselves from a perception of knowledge as something that both holds low taxonomic forms of learning and more complex forms of learning including skills and competencies.

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CHAPTER ELEVEN

BOOK TRAILERS IN LITERATURE EDUCATION: TECHNOLOGY AND INTERACTION SKILLS IN SUPPORT OF MULTILITERACY

Satu Grünthal and Johanna Pentikäinen

Introduction

Today many teachers and educators feel that motivating pupils to read fiction, especially novels, is more challenging than ever before, because pupils' lives are dominated by social media, new technology, and a hectic life style (e.g. Brozo 2010). Indeed, recent studies have shown that the reading motivation and abilities of young Finnish students continue to deteriorate (Harjunen and Rautopuro eds., 2015; Arffman and Nissinen 2015). This possibly reflects the more general changes in lifestyles and literacy activities in the Western world, not only in Finland.

For many adolescents, the act of 'reading' often means surfing status updates and text messages while simultaneously skimming internet newsfeeds and watching music videos, rather than immersing themselves for hours in long texts. On smartphones and other portable technology, they also receive fictional narratives through various channels, from movie trailers and music videos to games and comics. The changing environment of pupils' everyday life calls for the continuing development of pedagogical applications to help them engage in literary literacy.

Even in this rapidly changing pedagogical context, focused reading of long, written narratives, has indisputable advantages that underline literature's importance. These advantages have been discussed and analysed in several recent studies (e.g. Kidd and Castano 2013; Mar and Oatley 2008; Vezzali et al. 2015; Zunshine 2006). According to Mar and Oatley (2008, 173), reading novels can act as a simulation of social experience and learning, as in real-life situations, because fiction models and abstracts the human social world. Kidd and Castano (2013) point out that reading literary fiction increases the Theory of Mind, which refers to the individual's ability to understand the mental state and behaviour of other people. Vezzali et al. (2015) have also shown in their experimental research that reading can increase empathy and be used as a tool for improving attitudes toward stigmatized groups.

Research has shown that the decisive factor in reading motivation is the attitude towards reading, and as such it can be argued that the most important goal of reading instruction is to foster the motivation to read (Gambrell 1996, 14–25). As Merisuo-Storm and Soininen point out, differences in literacy skills are mainly a result of differing attitudes towards reading (2014, 122–130). It is, therefore, of central importance to develop new methods for reading motivation.

In order to promote novel reading motivation, we decided to design and carry out a book trailer project with student teachers that would test new ways to motivate reading fiction at school and to enhance teamwork in a literary context. We also wanted to integrate new technology and the use of a popular multimodal genre, the movie trailer, in literature pedagogy in this effort to motivate novel reading.[1] It has long been recognized that motivation is at the heart of many of the pervasive problems we face in educating today's youth. As Gambrell (1996) points out, research on fostering reading motivation at school has also proved that positive social interactions with other pupils increase reading motivation, and that peer recommendations are an effective tool in motivating pupils to read.

It can be argued that all forms of fiction, not only literature, can improve the Theory of Mind and contain mental-inferencing processes. Different forms of art and multimedia, such as films and theatre plays, can and often do have a positive effect on an individual's personal development and understanding of others. However, as Mar and Oatley (2008, 186) argue, literature can be considered the most abstract of narrative forms because it provides the reader with a purely symbolic and nonrepresentational portrayal of the social world and its agents. Thus, reading involves active participation and draws on imagination and memories to create the experience. Reading a novel usually takes several days or even weeks and demands long-term involvement. Reading literature involves "deep reading", which has been defined as "the array of sophisticated processes that propel comprehension and that include inferential and deductive reasoning, analogical skills, critical analysis, reflection and insight" (Wolf and Barzillai 2009, 32–37). These activities are critical to processing and understanding information, in which-ever format it is presented. Motivating pupils to read fiction and novels is one of the key elements in mother tongue education and it is also clearly stated in the Finnish National Curricula for Basic (2004, 44–55), secondary and Upper-secondary Education (2003, 34–40).

Continuing this tradition, the new National Core Curriculum (from 2016 onwards) is strongly based on the concept of multiliteracy. The current world is constituted of a diversity of digital, visual, graphic, and multimodal textualities, which call for a multiplicity of reading, writing, and interpretation skills.

Therefore, multiliteracy can be seen as a set of tools and capacities one needs in order to operate in today's world. Another focus of the new National Core Curriculum lies on phenomenal learning, where larger thematic issues are scrutinized in action and through several subject areas. Reading fiction and working with literature in innovative ways is effective in improve multiliteracy skills as well as phenomenal learning and understanding. This, in turn, fosters the richness and diversity of textualities and promotes diversity within education. Creating book trailers is an excellent and effective didactic method to attain such aims.

In addition, literature offers many advantages because of its large variety of enjoyable and enriching content. Likewise, literature calls for readers' responses and can be interpreted in multiple ways, which has educational benefits. These responses can be worked out in several ways. Book discussions are a traditional, but still an effective pedagogical tool (Galda and Beach 2001, 69). Research has also shown that students' responses to literature are both organized and broadened by the opportunity to write (Gambrell 1996, 14), and drama pedagogy also offers experiential ways to work with literature (e.g. Toivanen 2007). Finally, visual representations, such as videos and trailers, can be seen as ways to create and perform literary response. By selecting, reading, and analysing fiction in order to make their own visualized version of it, students make use of their own personal and cultural narratives, as wide and diverse as they might be. Production always involves meaning-making on the basis of readers' own interpretation, which also presupposes the personal involvement with the process, and so by supporting readers' own interpretations and encouraging them to create their own versions on the basis of the novels, we stress the importance of equality and diversity in language and literature education.

Research questions, methodology and research setting of the project

Research questions

In order to find answers to the challenges described above, we designed and carried out a book trailer project in the Department of Teacher Education at the University of Helsinki, in fall 2014. Our research questions were the following:

- How can a book trailer project be used in literature education?
- How does the process of making book trailers teach text analysis and literature interpretation skills?

- How does the process of making book trailers enhance technical and interactive skills?

As stated above, our project was carried out with student teachers at the university. Although our ultimate aim was to create a pedagogical tool that could be used in schools and with real pupils, we did not include the school part in the research setting described in this chapter. Thus, it should should be kept in mind when reading our results that all our data was collected amongst student teachers in the context of university classrooms—so when we speak about students, we mean university students. However, some student teachers used their book trailers later in the fall and spring during their practicums at school. In the "Discussion" section below, we undertake to envisage some perspectives of book trailer projects in comprehensive school settings.

Methods of the study

In the following, we analyse our project from several perspectives. First, we give an overview of the book trailer project and its aims. Second, we choose two different book trailers and analyse them in detail. In this way, we can pinpoint how making book trailers implements literature analysis and interpretation skills. These skills are also closely intertwined with the participants' interaction skills, because throughout the project they had to agree on a shared understanding of the novel in question and to produce a shared plan on how to create the trailer. Third, we turn to an analysis of the data collected from the participating student teachers through e-questionnaires. In these questionnaires, the students rated their own technology skills and their motivation to use technology in literature education before and after the project.

In our analysis, we have used different critical methods. When we analyse the two book trailer examples, we combine literary analysis with film analysis and compare which literary themes, symbols, and elements the students chose from the novels and how they visualized them in the trailers. This method could be called literary and visual close reading. As we stated earlier, the current broad conception of text consists of a diversity of digital, visual, graphic, and multimodal textualities. Within this framework, our method of analysing trailers that are based on certain novels can be seen as text analysis and as close reading in multiliteral settings.

Next, we use quantitative as well as qualitative data analysis with the data collected through e-questionnaires. In addition to rating their skills and

motivation using a Likert-scale, the students were able to comment on each statement in the questionnaires.

Finally, we conclude by looking back at our research project and evaluating it as a whole.

Research setting: The book trailer project

Our book trailer project was aimed at subject student teachers of Finnish language and literature and was carried out in the Department of Teacher Education, University of Helsinki, as a part of the first subject didactics course in fall 2014.

In teams of three to four people, student teachers chose a novel, on which they based a trailer manuscript. They then filmed and edited the trailer (about three minutes) by themselves. The trailers were targeted at 9th graders (15–16-year-old pupils) in secondary school. The trailers were mostly based on classic Finnish novels, because Finnish literature history is usually taught in the 9th grade. The assignment was to create a trailer that would not tell the whole story of the book but would instead raise school pupils' motivation to read it. Forty-four student teachers participated in the project, producing 16 book trailers. As teachers and researchers, we wanted to monitor the project by collecting the students' feedback as well as their opinions about the project. Students filled in a questionnaire before and after it. Before the project started, students were asked about their preconceptions about using technology as a motivator for reading and about their own habits in using technology. Accordingly, after the project they were asked about their experiences and thoughts about making book trailers. The questionnaire consisted of statements and optional comment sections. It was an electronic questionnaire, delivered to the participants through an e-mail hyperlink.[2]

Forty-four students completed the questionnaire when the project began, and 33 of them completed it after the project. Because we did not receive responses from all participants at the end of the project, the data is not fully comparable; however, it can still be used to construct an overview of the students' relationship with technology and on their feedback about the project. We will briefly refer to the survey in the discussion.

Our aim as teacher educators was to test the possibilities of new technology in promoting literature reading and analysis. We also wanted to encourage the students to reconstruct their own, well-argued interpretations of what they had

read. In addition, we wanted to emphasize the idea of integrating subject knowledge with technological and interaction skills in education. The results of the trailer project were impressive: we saw 16 coherent, visually polished, genre-sensitive, and diverse interpretations mostly of Finnish classics, but also about contemporary literary fiction, showing their makers' analysis and visual interpretation skills as well as teamwork skills under a demanding work schedule.

Book trailer as vehicle for literature analysis and interpretation

In the following, we introduce and discuss two book trailers made by two different groups of student teachers. In both cases, as indicated in the assignment, students were instructed to choose a classic Finnish novel, but were free to choose among any of those that they wanted.[3] The main idea of the trailer was to introduce the chosen novel to the pupils and encourage them to read it. Therefore, the trailer was supposed to raise interest without conveying the plot of the book in its entirety.

Our first example is a trailer project in which the students decided to retain the original era and milieu of the novel, whereas in our second example, the epoch as well as the surroundings of the original story were changed. Both trailers discussed here were skillfully made and evoked intriguing discussions amongst peer students.

The Wolf's Bride

The novel *Sudenmorsian* (1928, *The Wolf's Bride*) by Aino Kallas has been translated into English three times.[4] The relatively short but very intense and symbolic story is situated on the island of Hiiumaa, Estonia in the 17th century and is written in poetic, archaic Finnish.[5]

The Wolf's Bride tells the story of a young couple: the forester Priidik and his wife Aalo, whom he first encounters washing sheep in the sea. Aalo's beauty and gentle nature enthral Priidik and their marriage begins happily. As time passes, Aalo starts hearing whispers that entice her to join the wild wolves in the marshland. Unable to resist this voice of The Spirit of Forest, Diabolus Sylvarum, Aalo is drawn into the marshes and changes into a wolf through a mystical metamorphosis. During the night, she experiences immense joy and freedom in her new existence and runs in the forests with other wolves, but when morning breaks, she returns to her husband and her little baby girl. The wolves kill and eat numerous sheep, which causes much damage to the livelihood of the inhabitants

of the island and evokes fear. As the novel proceeds, villagers discover the truth about Aalo and, in the end, she and her little baby are burnt alive in a sauna. After that, Priidik shoots dead a wolf that he thinks bears the soul of Aalo.

The novel has inspired both artists and literary researchers. The story has been transformed into a play (by Aino Kallas herself, as well as others), and it has been much discussed in (especially) feminist literary research from the 1980s onwards (e.g. Kurvet-Käosaar and Rojola eds., 2011). For many female readers, the novel is a strong manifestation of women's struggle towards social, personal, and sexual freedom in the early 20th century.

The book trailer is based on central motifs of the book.[6] It demonstrates how textual motifs (in this case sheep, threshold, forest, fence, and fire) are visualized and strengthened through visual repetition and music. It makes effective use of the polarities that are the core of the novel and which are presented in its themes, feelings, and characters, in a variety ways.

The trailer consists of four basic scenes, which could actually better be described as pictures or images. These four scenes are a flock of sheep, a woman on a threshold, a forest, and a fire. There is no voiceover or dialogue in the trailer, but three citations from the book are shown on the screen, marking and underlining the turning points of the story. The first of them, which is also the first image seen in the trailer, makes the central issue in the novel clear:

> "[The Call of the Wolf] is like a command invincible that must be obeyed even though it leads to death and to ruin." (Cape 1930, 38)

Sheep are the central motif of the story in both the book and the trailer, because there is a continuous and developing entanglement of Aalo with the sheep (Undusk 2011, 145–162). In the trailer, sheep, a symbol of innocence and sacrifice, are seen grazing on a pasture.

In the next scene, the viewer sees a young woman, dressed in white, standing on the threshold of their store-room. The colour white is a link to the sheep from the previous scene as well as to innocence, a wedding dress, and holiness. The camera shot focuses on the woman's left hand, which she raises, and her wedding rings can be seen. The scene symbolizes the controversial themes of staying at home and leaving it, and the process of either obeying the call of the wolf or rejecting it. When the scene is next repeated in the trailer, the woman removes her shoes on the threshold and walks away barefoot. Aalo has made her decision and joins the wolves:

> "But the Evil One [orig. The Spirit of the Woods and the Wolf], who loveth not peace, had already chosen this woman for his own, as a lamb is branded from the fold - -" (Kallas 1928, 24).

In addition to the motif of threshold, the motif of fence is also used in the trailer. Both of these symbolic marks of a border line signify themes of polarity, difference, and departure.

The third central scene in the trailer is the forest. In contrast to the scenes of the sheep and the woman standing on the threshold, the forest scenes have been filmed using a hand-held camera; therefore, the camera shot is deliberately winding and bouncing. The outer focalization changes into inner focalization, which expresses the emotional turmoil in the main character, Aalo. The camera is whirling around, as is her whole existence.

> "But her soul and even her body were rudely shaken by a great whirlwind, as though some mighty power had borne her up from her foothold into the air, … till her breath was choked and she was nigh to swooning where she stood" (Kallas 1928, 24).

This circulating movement is continued in the first fire scene, where a candelabrum can be seen turning around with burning candles. The trailer ends in a second fire scene, where open flames burn high: the tragic end of the story is inevitable.

All visual elements in the trailer express symbolically the themes of polarity and dualism that fill the novel. Aalo is simultaneously a lamb and a wolf, a human being and an animal; she is both innocent and guilty. The forest scenes, more than others, question this polarity and meld the opposites into one symbiosis by means of inner focalization and a whirling movement. Due to these effects, it is no longer possible to clearly define whether it is the human being Aalo or the wolf Aalo who is running in the woods; thus, the thematic core of the novel is emphasized.

As a whole, the book trailer based on *The Wolf's Bride* makes use of various interpretative and modification strategies for adapting a literary text into a video. The work group chose those literary motives from the novel that they thought were most important in it, and they visualized these motives effectively. They also identified three core sentences from the novel and used them in their trailer, visually and aurally. In order to represent inner and outer focalization, they used stable or unstable camera shots. Their trailer focuses very strongly

on a few central images, symbols, and sentences from the book. It begins with a sentence hinting at death and perdition and ends with burning flames. These effects are common in the trailer genre and evoke sentiments of recognition and familiarity among the young.

The Red Line

Ilmari Kianto's novel *Punainen viiva* (1909; *The Red Line,* 2014)[7] tells a story about the first parliamentary election in Finland in 1907, at a time when the country was still officially part of the Russian Empire. Ilmari Kianto (1874–1970) was a Finnish author who became well-known for his picturesque, naturalistic novels set in poor, rural, and powerless communities in Eastern Finland. His most well-known novel is probably *Ryysyrannan Jooseppi* (1924), a family saga about a proletariat family living in a stark natural setting. As a person, Kianto was considered an anarchistic, somewhat ambiguous character: during the Civil War he vacillated between rightists and leftists and in his private life he has been said to support practical polygamy (e.g. Nevada 1986).

In *The Red Line*, the protagonist, Topi Romppanen, and his wife, Riikka, live their small, spare life in continual fear of the forthcoming hard winter and the hunger it might bring. Soon the political agitators come to their village to deliver their message and the main characters slowly sense the power of hope and also learn to use their new political right to vote. The story is set in a real historical situation—only a year before all Finnish women and men, 24 years or older, were given the right to vote, in 1907. Finland was the first country in Europe, and the second in the world, to give all women an equal voting right in the national elections.

From a contemporary perspective, *The Red Line* is a story that not only reflects the historical situation of its time, but also beautifully describes the slow birth of the modern human being, with a sense of power and rights that belong to even the poorest people: thus, the story signifies the ongoing progress of democratization and modernization. Even though the story is set in a remote, rural, and dependent country, as Finland was at the beginning of the 20th century, it still discusses the timeless, universal theme of human liberation.

The book trailer based on this novel carefully studies the novel's ideological roots and the story's connection to the political context of that time.[8] The book trailer brings the story to contemporary Finland, referring to urban poverty in the suburbs and to the groups that may yet yearn for equal rights. The opening section shows a view of an urban milieu of Pasila, a suburb of Helsinki

wellknown for its bureaucratic buildings, also underlining the alienation of modern life in contrast to the beautiful natural images in Kianto's novel.

The trailer uses many visual alienation techniques. In the opening section, the viewer sees cars, a tram, and even some pedestrians, but from a distant, outsider point-of-view. The selected visual narrative technique also refers to the use of a distant third person narrative that is common for realistic literary prose. The first voiceover is the agitator's, which signifies an outsider's perspective on the poor life of the main character:

> "Wretched is the life of the oppressed. Misery I have seen in every place I have travelled. But such misery as in these parts I have never seen anywhere" (Kianto, 83).

When the camera moves inside an apartment, the two main characters can be seen in the kitchen cooking simple spaghetti and lamenting the emptiness of the coffee box; the significance of this scene is to remind the viewer that coffee used to be a sign of well-being and delight in rural Finland. In the trailer, we only see the characters from behind, and they both have long curly hair of equal length. The voiceover is a steady, female voice reading the excerpts from the novel, echoing the lamenting, melancholic style of speech.

> Riika: You reckon we'll have any coffee in our house this coming Christmas?
> ------
> Topi: Don't you fret, Riika… I reckon this be the last time like this… (Kianto, 59).

The use of colours is another visual narrative technique that is used purposefully in the trailer. A greyscale in the opening section signifies a hopeless life and the appearance of red spots—of truck signals, traffic signs, graffiti, and finally a whole metro train—most obviously implies the possibility of change. There is still a unique human life waiting to flourish in the middle of an alienating milieu, just as the characters in Kianto's novel suffer a hard winter and long for an easier life. The appearance of the red increases the tension, leading to an explicit climax: the forthcoming elections.

> Cobbler: You know, Topi, on the fifteenth day o' this comin' March, this here land and this here world is goin' to turn topsy-turvy.

> Cobbler's Missis: You'll get to draw the red line, you will. And Riika, too! (Kianto, 37).

In the trailer, the colour scale suddenly changes and we see a multicolour image of the lively city centre of Helsinki, full of people on a summer's day. The Pride parade is under way and some carry rainbow-coloured flags. This occasion and the ongoing debates over same-sex marriage, in contemporary Finland as elsewhere, nicely fit with Kianto's novels' first elections and the new concept of voting rights. In the historical first elections in 1907, the vote was given by marking a red line to the form, in the spot of the selected candidate.

The book trailer implies some important interpretation techniques which the transformation from a literary classic to a modern-day book trailer presupposes. First, the transformation from the literary prose to the multimodal narrative is carefully put into practice by using visual techniques such as point-of-view and colours. Second, the novel's central elements are brought to the contemporary working-class dwelling environments and ideological and political contexts. Through the interpretation process, the objectives of literature education are achieved: the quality of the source novel has to be understood before the allusions can be made and understood. This process also underlines the multimodality of trailer-making as a literary education method: the working process includes analysis and use of various text types instead of only written literary fiction. Furthermore, it encourages the participants to think about the social use of the classics and literature in general.

Discussion

As our discussion in the previous chapter shows, producing book trailers out of books clearly develops students' analytic and interpretative reading skills. Planning, filming, and editing book trailers calls for a deep reading of the book first, since only then can the students choose meaningful aspects and themes from the text; They have to discuss them and decide which elements of the book to choose for their trailer. This, in turn, develops their skills in literary discussion and argumentation, as well as their interactional skills. It can be argued that creating book trailers can have at least three focus points: first, it can motivate pupils to read; second, it can provide students with opportunities for a larger and more manifold learning process than reading alone would; and third, it can be a tool for learning literary concepts and analytical tools.

Our project offers knowledge on the use of book trailers in literature education in general and particularly in teacher education. Based on the survey, we

can say that the project improved the pedagogical skills of student teachers and gave them new resources for their future work as professional teachers.

According to our questionnaire, many students fear that their technical skills are not strong enough for teaching, even though most of them use technology in their everyday lives and are interested in using it in classrooms in order to motivate their pupils. According to our survey, student teachers use a significant amount of technology in their everyday life (49% agreed and 37% moderately agreed) and almost 100% of them are interested in using technology in their classrooms (51% agreed; 46% moderately agreed). Most of them thought that the use of technology in literature tuition motivates pupils more than other motivation methods (12% agreed; 54% moderately agreed). Some students considered the book trailer project to be time intensive and found it stressful. Most students used video cameras in our trailer project—although some did decide to use their own iPads or even phones. This technical choice caused some extra work and stress because working with tablets or iPads would have been more familiar. Obviously, more technical support would be useful in future projects to alleviate such negative associations. Still, a strong majority of students thought the project was beneficial and worth undertaking. Our survey shows that, after the project, the majority of students thought it was reasonable and worthwhile (49% agreed and 27% moderately agreed). They found that trailer planning, filming, and editing was useful in terms of their future teaching job (36% + 39%), and their interest in using technology increased while working on the project (73% agreed and 24% moderately agreed). Merisuo-Storm and Soininen (2014) point out that motivation and achievement beliefs are important especially when tasks become more difficult. Learners with developed skills need challenges, because their motivation decreases with tasks that they think are too easy (Merisuo-Storm and Soininen 2014, 128).

One of our survey questions was whether the use of technology in literature education motivates pupils more than other motivation methods. The percentage of those who moderately disagreed increased slightly (from 32% to 39%), which may signify that the students' criticism towards technology increased. To us, this was a positive reaction: the technology is not an aim in itself, but rather a pedagogical tool to be used purposefully. After the project, most participants thought they had better skills to use technology in teaching, but still roughly one-third disagreed with the statement (6%). However, there were also two or three participants who did not use much technology in their everyday lives and showed no interest in using it in their classrooms either. Instead, they questioned the overarching rule of technology in our everyday lives and emphasized the importance of written fiction and other traditional, printed texts as a basis of their

own teaching. Their critical views were worth taking into consideration during the discussions in the class.

The book trailer project also gives valuable knowledge about learning projects in teacher education. It challenged us as teacher educators to deepen our pedagogical thinking and widen our methodological repertoire. This is needed, because promoting students' pedagogical thinking must be a central goal in all teacher education. This pedagogical thinking can only grow through testing and gaining experience from different teaching methods. Our study also encouraged us to continue developing practice-based projects, because only through practice will the pedagogical mastery of various tools be achieved.

Although at this point we only have experience of accomplishing a book trailer project in teacher education, we have reason to think that a similar project could also successfully be carried out in comprehensive schools. There, book trailers could be made by pupils themselves, following the lines we have described above. However, there are other aspects to consider in the planning of such a practice. To lead a successful project, the teacher of the course has to plan the working scheme, timetable, aims, and assessment of the project carefully and make them clear to all participants at the beginning of the project. In today's and tomorrow's classrooms, tablets, iPads, and smartphones provide user-friendly technology for different kinds of projects. If some teachers or pupils need technical support in using the movie-making programs of devices, that should be provided either by peers or by the technical personnel of the school. It must also be decided beforehand where and how the final trailers will be saved and the rules of the copyright law must be made clear to everyone.

In addition to using technological skills, the groups had to interact with each other in creating the book trailers. As we know from earlier studies, book discussions promote deeper understanding and new insights about the text in question and likewise must be a central element in all successful book trailer projects (e.g. Gambrell 1996). When the trailer group comes together and starts planning the trailer, they will—almost imperceptibly—find themselves involved in a lively conversation about the core elements, symbols, and meanings of the book. Because of the symbolic and ambiguous status of fiction, the text always includes "empty spaces", which the reader fills in during the reading process (Iser 1974; 1978). These empty spaces also allow pupils to connect the text with their own lives and their cultural context. A deep personal understanding of the book in question is needed in order to create a shared understanding of it. Book trailers can also be regarded as shared repertoires and as resources for the negotiation of meaning (Dugstad Wake, Dysthe, and Mjelstad 2007, 40–51). The

working process itself is where a variety of opinions may flourish by asking the pupils to promote their multimodal interpretations of the selected sources.

This working method teaches and requires team-building and cooperation skills that are strongly needed in today's diverse communities. Book discussions and creative teamwork instigate shared readership and authorship (Jacobs 2012, 271–274), which, in turn, promote feelings of belonging and sharing, that are even more necessary in multicultural life. Such skills—to make connections and relationships—are essential in today's diverse school environments. They strengthen pupils' self-confidence and their willingness to be members of the school community. Reading long texts, such as novels, also promotes equity because it strengthens all pupils' study skills. This project appeals to pupils with different learning styles and strategies, as it allows them to integrate textual, visual, auditory, and kinaesthetic learning and meaning-making resources, the use of which is strongly emphasized in multiliteracy education theories. In order to encourage textual diversity in education, teachers and pupils are to be encouraged to learn various meaning-making techniques of various textual genres, including those that are popular and influential in terms of youth culture. Finally, a book trailer project enables many different roles for the group members of each team. Work can largely be divided according to everyone's wishes and abilities: manuscript writing, film setup and locations, filming, acting, and editing.

Using technology may help pupils gain some learning targets by making it possible to create shared readership and authorship as well as "affinity spaces," where the participants can share their interests and goals regardless of their diverse linguistic, cultural, and social backgrounds (Gee 2010). Our book trailer project is an inclusive, socially aware and affirmative learning project in which the participants can feel the ownership of their own work and products. As a whole, it promotes active engagement, modeling, reflection, and the application of students' skills. It also supports change in terms of knowledge, consciousness, and the practices of students, teachers, and teacher educators.

The integration of a popular textual genre such as the movie trailer into education empowers pupils and allows them to use resources they may have learnt outside the classrooms. As Gee (2010) notes, the real meaning of technology is not in the applications and "tricks" themselves, but in the cultures of sharing and affiliation it may create. In addition, at its best, technology can foster motivation to read and give pupils a deeper understanding of literary texts. It can simultaneously promote interest in sharing and creating readers' own interpretations within the multimodal interpretation process. By producing their own interpretations, the pupils also use their own resources and analyse and reflect them.

Notes

[1] Short films and video making as a pedagogical tool in language and literature education have been tested out in two Berlin universities. The city also hosts an international Poetry Film Competition http://www.literaturwerkstatt.org/en/zebra-poetry-film-festival/home-zebra-poetry-film-festival/. See Anders 2013; Maaß 2010.

[2] Before the project, the students were asked to agree or disagree with the following propositions by using a Likert-scale: "I use technology a lot in my everyday life"; "I am interested in using technology in my teaching"; "My technology skills are strong enough to use technology in teaching"; "Technology should be used more in language and literature education" and "The use of technology in language and literature education motivates pupils more than other motivation methods". After the project, the students were also asked if they regarded the project as reasonable and useful and whether they felt their technological skills intended for classroom use had been improved during the project.

[3] Here it must be pointed out that Finnish curricula for education does not include compulsory reading lists. Finnish teachers of mother tongue and literature are free to make their own choices, although the reading presented in the study books may influence these choices. It is also a common practice that pupils can choose part (or even all) of the books themselves. For more information about literature education in Finnish schools, see Tainio and Grünthal 2012, 149–160.

[4] In 1930, Alex Matson translated the novel in collaboration with Bryan Rhys, and in 1975 he revised the translation in his own name only. In 2005, David Hackston translated the fifth chapter of the book (in The Daedalus Book of Finnish Fantasy, edited by Johanna Sinisalo, Sawtry: Daedalus).

[5] Aino Kallas (1878–1956) was a Finnish writer, who was married to Oscar Kallas, an Estonian researcher, who later became an ambassador to Britain. During her long career, Aino Kallas not only used Estonian themes and motifs in her own work, but also translated Estonian literature into Finnish. Later, she also acted as a literary and cultural ambassador between the two neighbouring countries. During her London years, she assumed the role of a spokeswoman and successfully promoted both Finnish and Estonian literature to the English-speaking world. See, also, Kirss 2011, 19–35.

[6] The book trailer was planned and filmed by three student teachers, Mirva Hautala, Kirsti Kuikka, and Auroora Vihervalli.

[7] Most of Kianto's works have not been translated into English. This translation is by Jaakko Mäntyjärvi and was published by Kiannon Turjanlinna Oy (Ilmari Kianto Society).

[8] This book trailer was planned and filmed by students Inari Mykkänen, Anna-Leena Pyykönen, and Ada Schwank.

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CHAPTER TWELVE

POETRY AND PLAY IN THE CLASSROOM: AVANT-GARDE POETRY IN THE PEDAGOGICAL CONTEXT

Peter Degerman

Introduction

This chapter addresses questions concerning the possibilities of modernist and postmodernist avant-garde poetry as a democratic tool in the classroom. In an increasingly complex society characterized by challenges and problems that exceed spatial and temporal boundaries, questions of subject content are caught between the uniformity of traditional methodologies and the fragmentation, multimodality and cultural heterogeneity of the new methodologies. As a consequence of digital media and reader-oriented literary theories, the concept of the literary text has broadened out as the role of literature in the classroom has decreased. The importance of literature as subject content can be argued for, according to these challenges, by clarifying the relation between the ontology of the text and the teaching of literature, making the concept of aesthetics the basis of the type of literature studied. This implies that specific types of literature—or media—calls for specific methodologies, something which in turn is related to certain learning outcomes. Following these important relations, this chapter outlines some of the possibilities of avant-garde poetry as a way of achieving democratic education by producing aesthetic knowledge, arguing that an attentive and collective reading of experimental contemporary poetry enables the creation of a zone of free play in the classroom, democratic in the way that the construction of knowledge is based on the sensuous aspects of art rather on the communicative aspects of language.

Background

The research area of reading literary texts in the educational context relies heavily on the theories of reader-response, developed initially by Richards and Rosenblatt. In *Principles of Literary Criticism* (1924), Richards maps out the aesthetic reception which lays at the roots of the influential practice of "close reading", and in Practical Criticism (1929) he describes an empirical study of his own students at Cambridge, letting them read thirteen poems without any knowledge of title, author or any other contextual information. The results had a great impact at the time, showing the variety and depths of misreadings to be expected of

competent students as well as the population at large. Richards was introduced in Sweden in the late 50s by Hansson, whose *Dikten och läsaren: studier over diktupplevelsen* (1959) is an attempt to accomplish an empirical study in the vein of Richards in the Swedish context.

Of greater importance for today's teaching of literature is Rosenblatt, whose concepts of the "efferent" and the "aesthetic" reading strategies—first put forth in *Literature as Exploration* (1938)—has been highly influential. These concepts—together with McCormick's concept concerning the matching or mismatching between the different "repertoires" of the reader and the text (1994)—are at the core of the research field of literary didactics. Efferent and aesthetic readings are to be seen as different ways to approach a text, the former being a more objective, factual reading, and the latter being more based on feeling—meanwhile, the concept of the reader repertoires is concerned with different reading experiences immanent in the understanding of a text. Although these theories acknowledge to some extent the structures laid down in the texts, and the possibilities of a common literary knowledge to be mediated, their interpretation in literature education tends to put emphasis on the subjective experience. The individual reader becomes the stabilizing center of language, and hence also of reading, and thus the structural aspects of text and reader are somewhat overlooked. This inability to see language as structure is based on an understanding of culture as the context that has already formed the individual, a context that can be pragmatically set aside when it comes to the unique encounter between the reader and the text.

Much the same can be said of Culler's *Structuralist Poetics* (1975) and the concept of the competent reader when filtered through the theories of contemporary cognitive poetics (Stockwell 2002). The structural theories of language are here interpreted in the context of the individual reading situation, examining the function of metaphor in the encounter between the reader and the text. Some of these examinations or empirical studies focus on the functions of the expert and the novice in the processing of texts (e.g. Scardemalia and Bereiter 1991; Peskin 1998), others are more oriented towards the structural devices in the text (Yang 2015)—but when it comes to reading in the educational context the focus is on the cognition of the individual reader. Reading can thus be seen as centered on the individual experience of the reader, an experience that becomes the only criterion for the understanding of the literary text in the classroom.

The understanding of the text as something that appears in the act of reading has been further complicated by the concept of the literary text as any kind of system of semiotic signs. In the 70s, when the literature pedagogy in Sweden

was mapping out the boundaries for the new research field, there was no doubt that the object in the center of the reading situation was a traditional literary text—preferably a realist novel. Today the research field is as concerned with the diversity of media modes as with the diversity of reading modes. In fact, the tensions between multimodal theories and traditional methodologies of reading literature are defining much of the research in literary didactics of the recent years. For example, Lundström and Olin-Scheller (2010) are advocating an understanding of the reading situation as an access to "multimodal text universes", this special kind of access being defined as a "narrative competence", with the supposition being that young people today consume narratives of different kinds and in different ways than those associated with traditional literature.

However, there is no simple opposition between traditional literature methodologies and new media didactics. Many researchers in the field, for example Hayles (2008), speaks about a differential "media ecology" or "landscape" where the new digital media and the old printed texts are different ways of understanding narratives. Even so, the tensions or ruptures in the understanding of literary pedagogy is palpable in the way that the epistemological questions concerning literature have been accentuated in recent research. The didactical discussions about literature as subject content in the classroom put emphasis on the underlying questions concerning the possibilities to delimit literature as a certain knowledge content—the crux of the matter being the particularity of literature. These discussions tend to divide the field between those advocating new digital media and those trying to show the pedagogical advantages of traditional literary studies, even though the research projects within the field are to be seen rather as products of a dialectical movement back and forth between those poles than actually representing either one of these extreme positions. As the example of Lundström and Olin-Scheller mentioned above indicates, some researchers are trying to show the pedagogical advantages of new media genres and a narrative competence connected to the understanding of multimodality, but they do not entirely rule out traditional literature and traditional literary methodologies as part of this narrative competence.

On the other side of the spectrum, research in literature pedagogy is trying to dispute an all too biased emphasis on new media genres. For instance, Öhman, in his publication *Litteraturdidaktik, fiktioner och intriger* (2015), calls attention to the way that reading on the internet tends to fragmentize and disunite the act of reading. Taking his starting points in Bakhtin's (1986) concept of speech genres, Öhman argues that the reading of novels makes it possible for readers to grasp extensive texts; following the plot of the novel, the reader is able to the embrace the text as a finalized utterance, making it possible to answer this utterance in the

act of reading. The conclusion is here that the fragmentized reading on the screen aggravates the comprehension of the material read because it does not enable any real meeting between the text, the author and the reader.

The emergence of this new interdisciplinary field of literature pedagogy is thus to be seen as part of a larger shift in the concept of knowledge in the humanities and the social sciences, from objectivism to subjectivism, from realism to social constructivism. In literature education, it has resulted in a change from a positivist reliance on facts and cultural heritage to a more dynamic and interpretive view on reading. However, although the research within the field has a constructivist concept of knowledge as its basis, the methods used are predominantly objectivistic, postulating a clear distinction between the empirical material and the interpretation of this material. Consequently, the field of literary pedagogy is formed on a fundamental tension between the subjective and the objective, focusing on the individual reader as the stabilizing locus of language—it is the individual experience of the reader that gives the literary text its meaning, and it is this individual that is the object of study, contextualizing the reader rather than the text, regardless of the ontology of the text. The empirical, ethnographic methods that are commonly used thus contradict the dominant constructivist concept of knowledge. The tension between an objective, scientific distance and a subjective, identificatory proximity is mainly visible as different reading strategies, as in the efferent and aesthetic reading modes, but also as different types of texts or genres, such as in the tentative difference between fiction or fact.

A concept of aesthetic knowledge

Another way of approaching the teaching of literature is through the concept of aesthetic knowledge. Instead of emphasizing the communicative aspects of the literary language, the literary text in the pedagogical situation is treated as a piece of art, and furthermore: the reading of the text in the classroom is in itself looked upon as an act of art. This concept of aesthetic knowledge production takes its departure in Schiller's radicalization of Kant's epistemology (Sychrava 1989). For Schiller, art constitutes an area of free play that makes it possible to abolish the contradiction between form and content, between activity and passivity, and opens up for a new kind of liberty and equality—a kind of equality that is not abstract but perceptible by the senses (Schiller 1795).

This idealistic aesthetic concept has been further elaborated by, among others, Rancière, whose works on the politics of literature take the romantic aesthetic revolution of the late 18th and early 19th century as a starting point (2007, 2010). For Rancière the politics of aesthetics has the potential of breaking up and

renegotiating hierarchies through the distribution of the sensuous. Because art is able to extricate the sensuous from its everyday connection, it can express the heterogeneous power of thought, renegotiating what it is possible to see, say, and understand within a certain context. In short, it deals with the autonomy of the poetic text, its context on the outside of contexts, providing the ability to break up the hierarchies that otherwise determine what is possible for us to experience. As Kenner observed apropos American modernist poetry: "Art lifts the saying out of the zone of things said" (1974, 60).

In the pedagogical situation, the mediation and production of knowledge have a particular problem when it comes to equality and liberty. Rancière argues that the fundamental pedagogical problem here is that the equality as taught in the classroom has equality as its goal, while all real equality must be there already from the outset (1987). The case is not—as in progressive pedagogy´s critique of traditional teaching—that democratic teaching conceals an unequal system, but rather that inequality can be a product of attempts to teach equality.

As literature is often used in the pursuit of teaching democracy (Bergöö 2005; Degerman 2012), the aesthetics of literature are right at the center of the pedagogical questions about equality and liberty. Instead of reader-response theories centered on the individual reader, the redistribution of the sensible in relation to art calls for a more collective and process oriented work with words—making the understanding of the literary text an area of free play. This implies that the teacher and the students together construct the meaning of the text, not necessarily as a priori "interpretative community" in Fish's sense (1980), but as a collective venture into the unknown. Of course, the kind of literary text chosen, the ontological outsets of these choices, do matter, and in making these choices it is inevitable that the teacher rather than the students gives the basic parameters for the play—but these can be considered as basic instructions; the production of knowledge takes place as a collective process—indeed, the artwork itself appears in that collective moment of free play.

To make this collective process of knowledge production as unrestrained as possible, the choice of literary genre—or, in this case, rather, the choice of material—has to leave as much as possible to free play. In this chapter, I am arguing for the use of a certain modernist or postmodernist poetry, connected to avant-garde art, especially the materialist poetry, for its concentration of the actual materiality of the words on the paper or the signals from the screen. This choice does not entirely rule out the expert and novice relation of the structural poetics, nor does it prevent the relativistic readings of the individual readers in a

socio-cultural context, but the conditions for an open-ended knowledge process are as heterogeneous as possible.

The advantages of materialistic avant-garde poetry in the classroom are, in this respect, easy to pin down. On one hand, contemporary avant-garde poetry does not rely on internal coherence, and often turns away from entities usually considered as fundamental of the poetic genre, most typically the metaphor; on the other hand, it is dependent on the contextual conditions of the reading situation and cannot be easily comprehended in the individual, subjective reading. This property of the avantgarde poem to turn away in some extent from the individual reader and to defy meaning, is in itself an advantageous premise for the production of meaning, perceptible by the senses, in the classroom situation—the teacher has some, but very limited, use of prior knowledge about the contextual preconditions of the poem, the students may or may not have some use of prior experiences, but in the work with the words of the poem none of them can take anything for granted.

Another obvious advantage of the avant-garde poem in the pedagogical situation is that the discussions about traditional text genres versus multimodal texts, which have to some extent infected the Swedish discourse on literature pedagogy, are made obsolete—the avant-garde poem is in itself multimodal, dependent on visual as well as sonorous aspects. And even though the internal coherence of the poem may not make any sense, the words used are often that of ordinary everyday language which students can relate to. The spatiality and musicality of the avant-garde poetry have, from the perspective of the history of literature, moved from modernism to postmodernism, making a transition from "free verse," where the focus is on the line, to "post-linear poetry" where the operational unit is "the word as such" (Perloff 2004). An excerpt from Cia Rinne's poem "le dernier cri" may serve as an example of how such poetry can appear:

* so
i
am
here

zen
at
random
obliging
unsophisticated
methods

* pièce à lire
c'est à dire
regardez-là: ---------- là ----------
---------- là ---------- là
------ et ---------- là ----------
---------- et venez ----------
---------- ici ----------
---------- au revoir ----------

* sort out
sort of,
sortie
* such and
such and
such and
such end.
(Allenstein, Andtbacka, and Mickwitz 2014, 157)

In this poem the singular words, or even the singular characters, are at the center. It can be approached as a two-dimensional artwork. The words on the page are arranged in a certain geometrical way—something which is of course nothing new to poetry, having been a feature of the genre since Antiquity. Nor is the musical aspect of the poem anything new—the lyrical aspects of poetry are an original precondition of the genre as such. The difference lies rather on the contextual level of meaning. The words on the page are arranged as a musical score, to be read on the page or read out loud in a "performance"—the performative dimension lies immanent in avant-garde poetry, emphasizing the collective and situational aspects.

A differential reading

As the avant-garde poem can be considered as hermetic, closed, defying internal coherence and metaphor, it is open in the way that it emphasizes the spatial and temporal appearance in the room. On one hand, it can seem that the poem is turning away from the reader, on the other hand, it is in many ways dependent on the reader's or on the audience's creative abilities. The question here is: where does the avant-garde poem appear? The answer is two-folded: in an internal sense, it appears within its own conceptual conditions, in an external sense it appears in the place where it is read. The latter answer is of course central to the pedagogical context—the poem appears in the classroom, and its appearance is therefore closely connected to the production and mediation of knowledge.

On the level of a specific subject methodology, the ideas of the 60s avant-garde, of materialistic poetry, is turned into praxis by the pedagogical work of Key-Åberg, himself an experimental poet (Key-Åberg and Olsson 1961). Key-Åberg transfers the traditional ideas of poetry education according to the literary climate of the 60s avant-garde, referring to to the Bauhaus School and to William Morris' Arts and Crafts-movement, developing a pedagogical material that he called "Poetic Play". For Key-Åberg, active in the idealistic context of the 60s, an important aspect of his pedagogy was the mission to distribute modern art and avant-garde art to people (Bäckström 1996). In accordance with the Bauhaus theories, he stresses the importance of the handicraft of the work with poetry, as well as the cooperative dimensions—the emphasis is on workshops, non-authoritarian pedagogy, and the belief that the ability to create art could not be taught, only delivered. Key-Åberg uses the basic principles of the Bauhaus pedagogy—the play with forms, the colors, the scissor being an important tool—emphasizing the materiality of the poems, the actual words on the paper, in a very hands-on approach to poetry reading. In the vein of the Bauhaus chief

ideologist, Gropius, the poetry pedagogy of Key-Åberg decidedly avoided any teaching that could be reminiscent of system, routine, or formula (Bäckström, 2010). In his conception of poetry reading in the educational context as a play with words, Key-Åberg combines the idealistic ideas of the Bauhaus pedagogy with the reader response-theories of Richards, whose ideas that the poetic text is something for the reader to use, fitted in well with the concept of poetry reading as a sort of handicraft.

These concepts of the poetry reading as a free play with words could be combined with the ideas of Perloff, one of the few theorists who have tried to combine analysis of avant-garde poetry with pedagogical ideas. Much in the same vein that Key-Åberg uses Richard's fundamental ideas on reader response, Perloff takes her starting point in the close reading of formalism and new criticism. However, the way she approaches the poetic is to see them as constantly in movement, constantly changing (Perloff 2004; 2010). Such a close reading is primarily about putting the poetic text in the center, not "losing the poetic language in the overwhelming splash of the contextual discourses", as Lundberg and Magnusson put it in their Swedish introduction to Perloff's work (2012). For this special attention to the poetic language, Perloff also suggests the method of "differential reading", which means a reading that is focused on minimal material differences, recognizing the importance of phonetic, syntactic, and the visual aspects of the poetic language. Focusing on minimal material differences implies not only paying attention to the words of the single poem on the paper or on the screen, but also pointing in the direction of an actual comparison between different versions or interpretations of the poem—which could be different versions of the poem on paper, or different modes of the poem, for example the difference between the poem on paper and the poem read out loud in the room.

The suggestion here is to use avant-garde poetry in the educational context, and to link Perloff's method of a differential reading with the ideas formulated by Key-Åberg in the early 60s, putting the word play at center of literature pedagogy, using the work with color and form as a collective way into a complex aesthetic language. This concept is also in keeping with the renaissance of concrete language poetry of recent years, emphasizing the reading of poetry as an active, co-creative, collective process. "It's all about a poetry community, an approach to poetry where no 'know how' and no single reader has the interpretative prerogative" (Nurbo 2008, 45). Perloffs's method of differential reading and Key-Åberg's concept of poetry as a play thus connect the ideas of poetry as a collective process in the reading situation, with the tradition of reader response-criticism and the tradition of idealistic aesthetics—poetry has its laws, its patterns, but the readings breaks up already established readings.

Conclusions

Even though questions concerning the relation between poetry and knowledge have been discussed from the 18th century onwards, this relation within a pedagogical context has been obscured by the tensions between traditional literary methodologies and new digital media communication, and between the concept of literary competence and the relativistic ideas of the text as an individual experience in the reading situation. These tensions could be utilized in the pedagogical situation by the concept of aesthetics understood as a mode of knowledge concerning that which is perceptible by the senses. This kind of knowledge holds within itself the possibilities of an equal, democratic learning situation, underlining the importance of feeling as a locus for the diversity of subject contents.

We can furthermore argue for avant-garde poetry as a useful way of establishing this learning situation. Using poetic language enables us to investigate uncertainties and ambiguities, and requires of us not to reach for conclusions or fixed orders of reasoning. The reading of avant-garde poetry is thus a mode of knowledge constructed in a collective condition of mystery and doubt, a negative capability not to reach out for fact and reason. One could therefore conclude that the reading of poetry puts teachers and students to a greater degree on the same level. The teacher has no definitive use of the traditional subject content knowledge; the student has no prior knowledge—none of them can take anything for granted.

On a methodological level, this means that emphasis on literary studies in the classroom should be put on the play of words—"play" to be understood in its aesthetic meaning, as a free area focused on knowledge through the senses. To achieve this play with words, modernist or avant-garde poetry are to be preferred as reading material. Perloff has, as we have seen, pointed to the fact that contemporary avant-garde poetry shifts the focus from linear to nonlinear reading. This calls for different kind of reading, a closer reading, a differential reading, where attention is focused on the individual words and the space between them.

Using poetry for this kind of reading is also a way of getting around the imperative of the narrative. Regardless of advocating multimodality or a more traditional form of literary studies, the narrative competence could, as we have seen, be defined as the core of the methodologies of today's literature pedagogy. Differential reading of contemporary avant-garde poetry implicates an understanding of the poetic language as a visual object on the page or on the screen, as well as a piece of spoken word music, rather than emphasizing the referential meaning of the language. Understood in this way, avant-garde poetry becomes

a truly multimodal language in the pedagogical context, regardless of narrative structures and referential communication.

The methods of reading avant-garde poetry described in this chapter have to be further applied to actual classroom situations, preferably in the form of comparative research, testing different kinds of literary texts and different kinds of poetry in the same settings, with similar ontological and epistemological framings. This chapter has outlined some possibilities for the development of aesthetic knowledge, and of avant-garde poetry as a tool for democratic education and a way of addressing today's cultural and modal heterogeneity in literature education—the suggestions for further research in this area will thus be a purposeful way to illuminate the specific pedagogical consequences of different types of text in literature education.

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Part IV: Assessment

CHAPTER THIRTEEN

ON EQUAL FOOTING? COMPARING SCHOOL GRADES AND NATIONAL EVALUATION RESULTS IN FINLAND

Raili Hildén and Juhani Rautopuro

Introduction

The definition of Justice, currently agreed upon across the entire western world, dates back to the Declaration of Human rights and includes a good life and welfare for all humans by their intrinsic integrity and dignity (Temkin 2011; Avermaet, Branden, and Houtte 2011). However, there does exist a wealth of competing views about exactly how justice and welfare should be materialized and implemented. One common denominator for these endeavors is equality, a notion as complex and difficult to define as justice. Still, the dimensions of equality regarded as essential for all citizens today can be cited to include liberties, opportunities for political participation, social positions and opportunities, and economic rewards (Gosepath 2011).

The current presumption of equality largely centers on "equal opportunities" for welfare and resources (Coleman 1966; Kalalahti 2012). Equal opportunities for welfare, regardless of differences, targets the advantages that an individual needs in order to live up to his/her full potential as a member of society (Arneson 1990). Materialization of welfare may, for justifiable reasons, imply the unequal distribution of resources (Rawsl 1972; Gosepath 2011).

Broad agreement seems to prevail on the role of education as a fundamental prerequisite for maintaining welfare, and on equality in various forms to gauge the process (Cookson, Levinson, and Sadovnik 2002). In Finnish scholarship, the notion of equality is attached to national and linguistic emphases in the sense of overall equal treatment of citizens in regard to resources. On the other hand, when referring to a fair share of resources between groups (e.g. men and women) the notion of equity is also used (Laiho 2013). In the policy documents of this millennium equity between genders has been brought to the forefront. In this chapter, we choose to use the notion of equality to refer to all kinds of fair and equal treatment.

Modern scholarship claims that equality of welfare and good life can only be attained and measured by acknowledging the diversity among students and

their differing needs (Duru-Bellat and Mingat 2011). The notion of diversity shares the substantial content of the elaborated notions of proportional equality in relation to, for instance, ethnic origin, age, nationality, language, religion, belief, opinion, health, disability, sexual orientation, or other personal characteristics (Non-discrimination act 2014). All aspects should be accounted for in pursuit of true equality in education, which in Finnish circumstances is enacted by a nine-year compulsory basic education offered to all children since 1970. During the first decades of implementation, encouraging results were witnessed in the Finnish compulsory education regarding most aspects of equality (Jakku-Sihvonen 1996). Yet in recent decades, some worrying signals of increased inequality have been discerned, e.g. early school-leaving without certification (which increased the need for support of various kind), insufficient learning outcomes, and unfavorable regional differentiation (Jakku-Sihvonen and Kuusela 2012).

In this study, we turn to diversity and equality issues by looking at the attainment of core competencies, as emphasised in the national core curriculum in certain subjects. The sufficient mastery of core competencies comprises basic literacies in linguistic, scientific, and mathematic domains to ascertain capacity for an active membership within a democratic society and a globalized world on a presumingly equal basis (NCC 2014). The target levels of desired mastery are defined for each subject as criteria for the attainment of grade 8 out of 10 on the Finnish scale for school grading. The rationale for paying specific attention to the school grades is motivated by the fact that the final report from basic education school is the primary document whereby young people apply to the second stage of education after having completed their compulsory education. Since school-leaving grades are the most important ground of selection to secondary education, their validity and fairness deserves careful consideration.

Our study builds on and completes previous research by looking at a range of studies on equality within Finnish general education, against which we mirror our findings. The scope of this chapter does not allow for a broad review of the relevant literature, but some of the most prominent titles will be outlined below. We will start by presenting the four most important background factors that influence a student's school performance.

Background factors

Gender

Equality issues between boys and girls have been scrutinized in-depth by Kuusela (2006) and Jakku-Sihvonen (2002). The major trend across school subjects and time trajectories is the excellence of girls in most subjects apart from mathematics and physics (Summanen 2014; Kuusi, Jakku-Sihvonen and Koramo 2009, 52; Hirvonen and Rautopuro 2012, 44–45; Kärnä, Hakonen, and Kuusela 2012; Mattila and Rautopuro 2013, 43–45). In mother tongue (Lappalainen 2011; Harjunen 2015; Silverström 2015) and foreign languages (Tuokko 2003, 2008; Väisänen 2003; Hilden and Rautopuro 2014a; 2014b; 2014c; 2014d) the absolute attainment of learning objectives on all linguistic sub-skills is significantly higher among girls with the exception of the English language (Härmälä, Huhtanen, and Puukko 2014).

Language of instruction

Finland is a bilingual country by law and basic education is given in the two official languages, Finnish and Swedish. Consequently, the language of instruction is an important background variable that is regularly scrutinized in the evaluations of learning outcomes. According to educational research on learning outcomes, the pupils of Finnish-language schools seem to outperform those of Swedish-speaking schools in most subjects. This finding has been replicated by the evaluations of learning outcomes in health education (Summanen 2014), biology, geography, and physics (Kärnä, Hakonen, and Kuusela, 2012), as well as in a longitudinal study of mathematics (Metsämuuronen 2013). The latest PISA results also indicate the lower achievement—although a higher sense of well-being was found in Swedish speaking schools compared with Finnish speaking schools (Harju-Luukkainen and Nissinen 2011).

In foreign languages, on the contrary, the pupils of Swedish language schools generally attain higher results than their Finnish speaking peers. This is prominently the case in English (Härmälä, Huhtanen, and Puukko 2014, 12), German (Hilden and Rautopuro 2014b, 14) and French (Härmälä and Huhtanen 2014, 217) and is most obviously explained by the linguistic affinity of L1 and target languages.

SES (parents' matriculation examination)

In many Finnish educational studies, the complicated concept of SES is operationalized by means of asking the respondents if they hold a certificate from the final examination from upper secondary education, the Matriculation Examination. Comparisons of learning outcomes in regard to parents' educational level indicate performance gap between children of higher educated parents and those pupils whose parents have not passed the exam. Recent studies confirming this tendency comprise for instance health education (Summanen 2014, 107–108), history and social studies (Quakrim-Soivio 2012, 113), and math (Hirvonen and Rautopuro 2012, 52–54). Moreover, in all foreign languages, children of higher educated parents outperform their peers (Härmälä, Huhtanen and Puukko 2014; Hilden and Rautopuro 2014a, 2014b).

Study plans

After a completed basic education, most pupils continue their studies in secondary education, either at a more theoretically oriented upper secondary school or at the institutes of vocational education and training. When comparing pupils aiming at general upper secondary education and pupils opting for vocational education and training, several studies evidence higher learning outcomes for those who prefer general upper secondary education. This applies to the case of history and social studies (Quakrim-Soivio and Kuusela 2012, 57–58), math (Hirvonen and Rautopuro 2012, 53), and mother tongue and literature studies (Harjunen and Rautopuro 2015, 83).

In Finland, pupils' admission to upper secondary education is based on their school-leaving grades from basic education, and it is justifiable to assume that the grade reflects knowledge of a subject across individuals and groups. Deviations from the legal assumption pose challenges for pedagogical implementation in treating diversities for achieving equality through fair assessment. Some of the previously mentioned research reports also discuss bonds between knowledge and skills evidenced in the evaluation and the school grade in the subject assessed. Generally speaking, better performance across all comparable groups is accompanied by higher school marks. At a closer look, though, the distinction force of grades often appears insufficient. The overall correspondence between the school grades and evidenced mastery of subject knowledge has proved to be low in math (Mattila and Rautopuro 2013, 60–62), social sciences (Quakrim-Soivio 2013, 157–204), and health science (Summanen 2014, 112). Quakrim-Soivio and Kuusela (2012) in particular, argue for a tendency among

teachers to adjust their grades to the level of school rather than to the guidelines provided by the National Core Curriculum.

Group comparisons of the correspondence between evidenced attainment of learning outcomes and school grades are rare in number, but a few findings allude to differences between genders. In mother tongue, boys tend to be assigned higher grades than girls for the same performance in national evaluations at both Finnish speaking and Swedish speaking schools (Silverström 2008, 11–12; Lappalainen 2008, 69–73). In mathematics, conversely, girls seem to be rewarded with higher grades for the same performance (Mattila 2003,16). In mother tongue and literature there are indications of different content criteria applied to grading between girls and boys (Harjunen and Rautopuro 2015, 95).

To add insight into the capability of the Finnish school system to enact equality at the crucial point of admission to upper secondary education, the research presented in this chapter addresses the following research questions:

1. (RQ1) What is the overall correspondence between linguistic skills and the school grade assigned by teachers?

2. (RQ2) How does the correspondence between the school grade and linguistic skills vary in different languages across: 1) certain student background variables (gender, language of instruction, SES, study plans); and 2) their combinations?

Applying RQ1, we examine the correlations between the school grade and each linguistic sub-skill (listening, speaking, reading, and writing) across all pupils who participated in the evaluation in English, Swedish, and German. To address RQ2, the match between the school grade and evidenced language ability is studied against background variables, firstly one by one, and secondly, across the sets of multiple variables. The variables addressed are gender, parents' educational background, upper secondary orientation, and language of schooling. Here, the educational background of the parents takes the form of a simple indicator for SES encompassing three options related to the matriculation exam: none of the parents have taken the exam, one parent has taken the exam, or both parents have taken it.

Data and method incorporate a multi-stage stratified random sample of pupils of Finnish basic education schools at the end of compulsory education (at the age of 15). The data sets include English, advanced syllabus (n = 3 273), Swedish, advanced syllabus (n = 1 643), and German, short syllabus (n = 1

263). The data is a representative sample taking into account different provinces, different municipality types, and schools of a different kind and size in Finland.

The pupils carried out a selection of tasks in listening and reading comprehension, speaking, and writing. They also filled in a questionnaire mapping their study practices and attitudes towards the subject, but its results are not discussed here. The assessment tasks were derived from the national core curricula for basic education (2004) where the target levels of core competence are expressed along an illustrative level scale ranging from elementary mastery up to a highly proficient use of language. The scale is a Finnish adaptation of the Common European Framework of Reference (CEFR, 2003) six-point scale, elaborated to cover altogether ten sub-scales. The preferable standard level of good mastery (hereafter also labeled as the target level) was linked to grade 8 on 4–10 scale, which served as a baseline for comparison. In advanced syllabi, the grade 8 level of good mastery is adhered to a single proficiency level. In short syllabi, a range of two subsequent levels (e.g. A1.1–A1.2) defines a target level (also called such). In fact, the actual school grade is a combination of effort and achievement, whose mutual weight is not proposed in the curricula. In this study, we only address the achievement strand, operationalized by the four sub-skills of language ability.

The data was analysed using various statistical methods. Basic results have been presented using descriptive measures (e.g. percentage distributions and measures of central tendency and variation). The associations between categorical variables were examined using the traditional chi-square test. Associations between quantitative variables were examined by using the Pearson correlation coefficient. Coefficients of determination (r-square) measuring the effect size are also reported.

The group differences were tested using independent samples t-test. In addition to statistically significant differences (p-values), effect size measures (Cohen's d) are also reported. The interpretations of Cohen's d-value are quite relative. In this chapter, effect size approximately 0,2 means "small effect", effect size around 0,5 "medium effect", and effect size around 0,8 or more refers to a large effect (Cohen 1988, 10).

Pupil performances in speaking and writing were assessed on the level scale and 10 % of them were censored afterwards. The correspondence with initial teacher assessment were satisfactory (r = 0,7–0,9) to ensure sufficient level of reliability. The listening and reading comprehension items were set on the same level scale by applying a standard setting method (bookmark) based

on a two-stage procedure that combines rater perceptions of the difficulty level of an item with the empirical data derived from the pupil sample (Cizek 2011). It is common that the standard setting procedure of the particular type does not allow determining as many cut-off scores between levels as were applied for the productive skills.

Results

RQ1. Correspondence between linguistic skills and school grade assigned by teachers

In the national core curricula, the level of good mastery is adhered to grade 8 on a ten-step level scale. Table 13-1 depicts the range of the school grades covered by the evidenced receptive language ability at that level. The match between the intended level and grade 8 is acceptable in the advanced syllabi, but surprisingly weak in the short syllabus of the German language. A possible explanation is that in advanced syllabi, grade 8 was adhered to a single level, whereas in short syllabi, a range of two levels was used to define the respective mastery. The case of short syllabi is further complicated by the obvious bias that the formal level of good mastery was attained as early as at grade 5, which indicates problems in terms of either level requirements or school assessment, both alternatives in need of consideration and improving measures.

Table 13-1. Correspondence of school grades and attained target levels in receptive skills

<table>
<tr><th></th><th colspan="2">Swedish (advanced)</th><th colspan="2">English (advanced)</th><th colspan="2">German (short)</th></tr>
<tr><td>Grade</td><td>Listening</td><td>Reading</td><td>Listening</td><td>Reading</td><td>Listening</td><td>Reading</td></tr>
<tr><td>4</td><td rowspan="3">Below target level</td><td rowspan="3">Below target level</td><td rowspan="4">Below target level</td><td rowspan="4">Below target level</td><td></td><td rowspan="2">Target level</td></tr>
<tr><td>5</td><td>Target level</td></tr>
<tr><td>6</td><td rowspan="5">Above target level</td><td rowspan="5">Above target level</td></tr>
<tr><td>7</td><td>Target level</td><td rowspan="2">Target level</td></tr>
<tr><td>8</td><td rowspan="3">Above target level</td><td>Target level</td><td>Target level</td></tr>
<tr><td>9</td><td rowspan="2">Above target level</td><td rowspan="2">Above target level</td></tr>
<tr><td>10</td><td>Above target level</td></tr>
</table>

Table 13-2. Correspondence of school grades and attained target levels for productive skills

<table>
<tr><th></th><th colspan="2">Swedish (advanced)</th><th colspan="2">English (advanced)</th><th colspan="2">German (short)</th></tr>
<tr><td>Grade</td><td>Speaking</td><td>Writing</td><td>Speaking</td><td>Writing</td><td>Speaking</td><td>Writing</td></tr>
<tr><td>4</td><td rowspan="3">Below target level</td><td rowspan="4">Below target level</td><td rowspan="3">Below target level</td><td rowspan="3">Below target level</td><td>Below target level</td><td rowspan="4">Target level</td></tr>
<tr><td>5</td><td rowspan="3">Target level</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td>Target level</td><td>Target level</td><td>Target level</td><td>Target level</td></tr>
<tr><td>8</td><td rowspan="3">Above target level</td><td>Target level</td><td rowspan="3">Above target level</td><td rowspan="3">Above target level</td><td rowspan="3">Above target level</td></tr>
<tr><td>9</td><td rowspan="2">Above target level</td></tr>
<tr><td>10</td></tr>
</table>

Table 13-3 shows, in percentages, how the school grades were distributed across the languages under study. In all languages, grade 8 (good mastery in advanced syllabi and the target level in short syllabi) was assigned to approximately one fourth of sample pupils. The reliability of grades cannot be deduced

Table 13-3. Division of school grades in percentage in different languages

	Swedish (advanced)	English (advanced)	German (short)
Grade	Total (1659)	Total (3421)	Total (1327)
4	0,6	0,3	0,3
5	4,3	4,2	4,1
6	13,6	13,2	10,4
7	24,6	21,4	19,8
8	23,9	25,0	24,9
9	24,1	27,0	27,0
10	9,0	8,9	13,6
Grade mean Std.dev.	7,8 1,3	7,8 1,3	8,0 1,4

in a straightforward way, but in all languages the majority of pupils attained or exceeded the target levels in most linguistic sub-skills, as can be concluded from the table.

In Table 13-4, the correlations between the school grade and sub-skill score across languages becomes visible. In most cases, the association is high or very high. The best average match is in English (0,68), followed by Swedish (0,68). In the short syllabus (German), the correspondence is somewhat lower. Although the overall figures are reasonably high, the following chapters are dedicated to an in-depth analysis of the diversity behind the big picture.

Table 13-4. Correlations (and r-squares) between school grade and sub-skills in different languages

	Swedish	English	German
Listening	0,63 (40 %)	0,65 (42 %)	0,57 (32 %)
Reading	0,70 (49 %)	0,70 (49 %)	0,60 (36 %)
Speaking	0,65 (42 %)	0,63 (40 %)	0,59 (35 %)
Writing	0,68 (46 %)	0,75 (56 %)	0,66 (44 %)

$r < 0{,}20$ very weak ($r^2 < 4\%$)
$0{,}20 \leq r < 0{,}35$ weak ($4\ \% \leq r^2 < 12\%$)
$0{,}35 \leq r < 0{,}65$ moderate ($12\% \leq r^2 < 42\%$)
$0{,}65 \leq r < 0{,}85$ high ($42\% \leq r^2 < 72\%$)
$r \geq 0{,}85$ very high ($r^2 \geq 72\%$)

RQ2. The correspondence between school grade and the linguistic skills in different languages

Gender. When comparing the percentage distribution of school grades between boys and girls, we find an overall tendency of girls receiving higher grades than boys. This seems to apply to all languages and syllabi with indisputable statistical significance. The difference was the widest in Swedish ($d = 0{,}69$) and smallest in English ($d = 0{,}33$). When examining these two groups in different languages, we observed that that there was significant difference between boys and girls in Swedish and German, but not in English (Table 13-5).

Table 13-5. School grade percentages assigned to boys and girls in the three investigated language syllabi

	Swedish (advanced)			English (advanced)			German (short)		
Grade	Boys 678	Girls 981	Total 1659	Boys 1738	Girls 1683	Total 3421	Boys 499	Girls 828	Total 1327
4	0,9	0,4	0,6	0,5	0,2	0,3	0,6	0,1	0,3
5	8,1	1,6	4,3	5,2	3,3	4,2	6,2	2,8	4,1
6	18,9	10,0	13,6	14,6	11,7	13,2	16,8	6,5	10,4
7	32,9	18,9	24,6	23,2	19,5	21,4	25,3	16,5	19,8
8	20,1	26,5	23,9	25,1	24,9	25,0	21,8	26,7	24,9
9	16,8	29,1	24,1	25,0	29,0	27,0	21,4	30,3	27,0
10	2,4	13,6	9,0	6,4	11,4	8,9	7,8	17,0	13,6
Grade mean Std.dev.	7,2 1,3	8,1 1,3	7,8 1,3	7,7 1,3	8,0 1,3	7,8 1,3	7,6 1,4	8,3 1,3	8,0 1,4
	$p < 0{,}001$; $d = 0{,}69$			$p < 0{,}001$; $d = 0{,}33$			$p < 0{,}001$; $d = 0{,}54$		

In regard to the validity of school grades, we could expect girls' grades to be higher than boys', because they did outperform boys in all other syllabi apart from advanced English. Our results are consonant with those of Jakku-Sihvonen (2002) discussing the superiority of girls in most school subjects, but also with the results by Härmälä et al. (2014) concerning boys' excellence

in English language. It bears mentioning, however, that such a difference in outcomes between genders is not advantageous from the point of view of societal consequences.

In regard to the correspondence between grade and productions skills displayed by boys and girls, the following findings were detected. In Swedish (advanced syllabus), there were no differences in the correspondence of grade and language ability between boys and girls (RQ1). The correspondence between school grade and target level was quite the same when examining the data according to pupils' future study plans and parents' education. In English (advanced syllabus), there were no differences between boys' and girls' school grades. The situation was the same when examining the data according to pupils' future study plans and parents' education.

Language of instruction. Both Finnish and Swedish speaking language groups were represented in the English and German data. The English data from Finnish-speaking schools suggest that pupils with grades 4–7 scored lower than the level of good mastery (CEFR level A2.2), those with grade 8 achieved the target level, and in both listening and reading those with grade 10 exceeded the target level. In Swedish speaking schools, the target level was attained by all pupils whose grade was between 4 and 9 in listening—the linguistic properties of related languages have a role to play here. However, in reading the correspondence between grades and attainment of target level is more similar to that of the Finnish speaking schools, with the exception that pupils with grade 7 placed at the target level, and those with grades 4–6 below it. Swedish speaking pupils with grades 8–10 scored higher than the good mastery level in reading. The excellence of Swedish speaking pupils was obvious, but the finding also suggests that in schools with Swedish as the language of instruction lower grades tended to be assigned for the same ability in the middle band of the assessment scale (grades 7–8).

In English speaking and writing skills, the target level was achieved with a lower school grade in Swedish speaking schools (grade 6) than in Finnish speaking schools (grade 7).

In short syllabus German, pupils from grade 7 on, attained the target level in listening and from grade 6 on in reading. In Swedish speaking schools the target level was attained by pupils with grade 6 or above in listening and pupils with grade 5 and above in reading. This, again, suggests a higher requirement level within Swedish speaking schools.

In German (short syllabus) there were no differences in correspondence between grade and linguistic skills between boys and girls. In speaking skills, some differences between Finnish speaking and Swedish speaking schools were detected. In Finnish speaking schools, the target level was reached when the school grade was 8, in Swedish speaking schools at grade 6. In Swedish speaking schools, none of the pupils were below the target level. The grading in Finnish schools might be somewhat more lenient than in Swedish schools. Yet, the number of students having school grade 4 was too small for drawing any strong conclusions regarding this group (Table 13-7).

SES (parents' matriculation examination). In line with previous research, this data shows that school grades are better the higher the parents' SES. The overall tendency in all languages and syllabi was a higher achievement among children of better-educated parents, but no systematic differences were discerned in the correspondence of evidences of knowledge and school grade.

Study plans. There was a noticeable difference in school grades in favor of pupils who aim at upper secondary school compared with those aiming at vocational studies. The finding conforms to the evidenced attainment of learning outcomes and corroborates a suite of previous research, reported above.

When it comes to the correspondence between target level and school grade in English, it seems that in receptive skills the target level was attained by upper secondary oriented pupils at grades 7–8, and by vocationally oriented pupils at grades 8–9. The vocationally oriented young people seem to have received a higher mark with less skill than the upper secondary oriented ones. In Swedish, no difference was detected in the correspondence between grade and ability between secondary and vocationally oriented pupils. In German, those aiming at upper secondary education all reached the target levels from grade 6 onwards, while among pupils targeting towards vocational studies, that level was attained at grade 7. All significant coefficients of determination between the scrutinized variables and combinations of them are summarized in Table 13-6.

Table 13-6. Significant coefficients of determination in percentage across school grade, linguistic sub-skill and certain background variables (high associations are bolded)

	English (advanced syllabus				Swedish (advanced syllabus)				German (short syllabus)			
	Listening	Reading	Speaking	Writing	Listening	Reading	Speaking	Writing	Listening	Reading	Speaking	Writing
RQ1												
Gender	x	x	x	x	x	x	x	x	x	x	x	x
Boys	41,0	49,0	38,4	53,3	34,8	44,9	43,6	42,2	32,5	34,8	34,8	41,2
Girls	44,9	51,8	41,0	57,8	36,0	47,6	34,8	43,6	31,3	36,0	31,3	41,0
SES	x	x	x	x	x	x	x	x	x	x	x	x
Both ME	30,0	39,1	25,5	52,7	39,1	48,6	44,2	44,2	29,2	34,1	24,3	38,9
One ME	37,7	45,7	36,1	51,6	34,7	48,0	38,3	44,2	27,2	31,7	33,1	39,3
Non-ME	37,8	45,8	40,4	45,3	39,4	46,0	38,4	45,3	32,4	34,5	37,1	43,0
L of instruction	x	x	x	x					x	x	x	x
Finnish	43,6	51,8	43,5	57,8					36,0	41,0	37,0	44,9
Swedish	30,3	37,2	18,5	43,6					25,0	34,8	26,0	39,9
Study plans	x	x	x	x	x	x	x	x	x	x	x	x
Upper secondary	28,9	37,7	23,6	47,7	33,2	42,9	37,2	41,1	28,1	29,2	29,2	39,7
Vocational	36,1	42,0	37,0	44,2	33,4	33,4	31,6	32,7	25,0	34,8	33,6	37,2
RQ2												
Gender+SES												
Gender+L of instruction	x	x	x	x					x	x	x	x
Finnish+Boys	42,9	50,3	43,0	55,4					38,7	39,9	38,6	47,1
Finnish+Girls	46,5	54,2	44,4	61,6					32,6	39,4	32,6	41,9
Swedish+Boys	30,8	39,7	39,7	43,0					22,8	38,1	21,7	39,8
Swedish+Girls	31,7	34,3	21,5	42,1					22,0	28,5	28,3	35,8

$r < 0,20$ very weak ($r^2 < 4\%$)
$0,20 \leq r < 0,35$ weak ($4\% \leq r^2 < 12\%$) $0,35 \leq r < 0,65$ moderate ($12\% \leq r^2 < 42\%$) $0,65 \leq r < 0,85$ high ($42\% \leq r^2 < 72\%$)
$r \geq 0,85$ very high ($r^2 \geq 72\%$)

Summary

Returning to the theoretical framework of our study comprising the practical implementation of equality (Gosepath 2001, level 3), the results of our study indicate only moderate correlations between four linguistics skills and the school grade. While the overall attainment of target levels was good or even excellent, significant differences were detected in how precisely the school grade and the assumed level of its mastery really coincided. In the advanced syllabi of English, Swedish, and German, pupils who were assigned grade 8 on their school report exceeded the target level and displayed language ability corresponding to higher school marks. The type of linguistic skill also made a difference: writing proved to be the most demanding skill to master in terms of earning grade 8.

On the other hand, regarding pupils displaying the ability corresponding to the target level, we found that, on average, only a third of them really had grade 8 reflected in their school report. These deviations varied again by language and sub-skill. The correspondence between language ability and school grade was higher in advanced syllabi where one single level was specified as the target. Nevertheless, the results of short language syllabi based on a flexible two-level target setting were far less convincing when it comes to the validity and differentiation power of school grades. At the lowest target level, ability evidenced by assessment tasks was rewarded by four different school grades ranging from 5 to 8.

The group-wise investigation revealed the most significant differences between ability and school grade with respect to the language of instruction and parents' level of education. Pupils in Swedish-language schools showed significantly higher levels of language ability in regard to their school grade than did pupils in Finnish-language schools.

Referring to level 2, defined the beginning of the chapter, these findings point out certain challenges related to equality of opportunity in getting admission to upper secondary education. Individual pupils possessing the same level of language ability were treated differently depending on who taught them and assigned them the grade. When it came to groups of individuals, gender, parents'educational level, and language of instruction (Finnish/Swedish) had a significant impact on received grades. The findings clearly challenge the validity of school grades as indicators of attained proficiency and fair goalkeepers to upper secondary education, especially as the same tendency recurs for other school subjects over years (Ouakrim-Soivio 2013).

Level 1 of the more abstract ideals and principles is materialized through the circumstances at two concrete levels. One possible interpretation of the findings of this study is that social opportunities to enter secondary education in pursuit of a good life and welfare vary, occasionally even in a substantial manner, across individuals and groups. Such a result unavoidably poses challenges for pedagogical implementation in treating diversities in an equal manner through fair assessment.

To improve correspondence between knowledge and school grades, teachers might need a more specific set of criteria for assigning final grades in their subject. The mixed nature of composition of school grades should be clarified, for instance by defining separate proportions of the grade for subject knowledge and effort—an easily implemented measure that would enable teachers to systematically deploy multiple forms of assessment and to assign more valid and fair school grades to their diverse pupils.

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CHAPTER FOURTEEN

MODE EFFECT IN LARGE-SCALE ASSESSMENT

Juhani Rautopuro and Elina Harjunen

Aims

In Finland, there is an objective to digitize traditional pen-and-paper based large-scale assessments of learning outcomes. For example, the matriculation exam (approximately 35 000 participants per year) should be completely digitized by 2019. Likewise, the Finnish Education Evaluation Centre (FINEEC) has started digitizing sample-based (approximately 10 % of the age cohort) evaluations of learning outcomes in basic education. The purpose of the assessments is to produce reliable information on how well the objectives of the national core curriculum for basic education are met, and on success in promoting educational equality. Inspired by this trend, the aim of this chapter is to concentrate on educational equality and justice. The data of this study is based on an external, national assessment of learning outcomes in mother tongue (Finnish) and literature at the end of basic education, from April 2014. Two different assessment modes were applied: a traditional pen-and-paper version and a digital environment. The assessment consisted of assignments in linguistic knowledge and writing competence. The a priori assumption was that assignments of this kind could lend themselves well to the digital environment. On the basis of the results, we discuss the similarities and differences between a printed version and a digital version of the assessment. Factors associated with the results are also discussed.

Introduction

Over the last decades, there has been an increasing demand to reform the methods of education and assessment (e.g. European Commission 2009). Towards this end, numerous computer-based environments and platforms have been constructed to develop teaching, learning, and assessment. However, large-scale, coherent, and evidence-based research on the impact of these environments is quite exiguous. Furthermore, the introduction of new technology and environments has not very often been conducted on the terms of pedagogy (Lehtinen 2006; Tossavainen 2013).

In April 2014, the Finnish Education Evaluation Centre (FINEEC) assessed learning outcomes in mother tongue and literature at the end of basic education. Together with a pen-and-paper test, a digital environment was field-tested in

an assessment of learning outcomes at the end of comprehensive school for the first time (in Finland). The experiment was quite encouraging but also a little confusing.

Transforming student assessment from a pen-and-paper to digital is a challenging task. The benefits of digital assessment are widely accepted; Digital environments provide the possibility for rapid data collection and analysis, allow assessments to take place anywhere, facilitate the use of enhanced and multiple assessment tasks, promise updated feedback, and offer various possibilities for the research of students' thinking and their misconceptions (e.g. Masters 2013, 24–27; Williams 2012). Moreover, digital environments enable an effective use of adaptive testing (e.g. Lahti et al. 2013).

The flip side of the coin is that in order to ensure the validity of the assessment, equal inward and outward circumstances should be guaranteed. From the point of view of the students, the cognitive load of the assessment environment must be considered carefully. Research has shown, for example, that students familiar with the assessment environment perform better compared to students using the environment for the first time. Therefore, teachers should introduce the tool properly, so that students can focus on the issues at hand, not on the tool. In addition, an unfamiliar environment can bring on an insurmountable cognitive load, especially for students with learning difficulties (e.g. Clariana and Wallace 2002; Ford Lawton 2014; Laakso et al. 2008; Noyes et al. 2004).

The assignments in 2014 were basically the same in both versions of the assessment. They were primarily planned for the paper (main) version of the assessment. Therefore, certain assignment types did not lend themselves as well to the digital environment, or their usability differed from that of the printed one. Similar findings have been detected in previous research (Chua and Zuraidah 2013; Kim and Huyhn 2007). For these reasons, the comparison between digital and paper-based assessment remains indicative, since even though the assignments shared the same principles, they differed in their method of execution.

The teachers, researchers, and evaluators of learning outcomes should be people with the skills of "digital assessment literacy". In practice this means that, at the most basic level, a person understands the use of digital tools in all phases of an assessment, at an intermediate level, a person has a holistic view of using alternative digital methods integrated with assessment, and, at an advanced level, a person is capable of sharing the methods for assessment and collaborate with other partners of the assessment in various ways (Eyal 2012).

Data and methods

The data used in this research came from 3 345 pupils (99 schools) who participated in the paper version of the assessment and 1 799 pupils (50 schools) who participated in the digital version. The assessment took place at the end of basic education (9th grade), when most of the pupils were 15 to 16 years old. In the pen-and-paper version, 52 % of the participants were girls, in the digital version 49 %. The data was collected by using two-stage stratified random sampling. The data is a representative sample taking into account different provinces, different municipality types, and schools of different kind and size in Finland (Harjunen and Rautopuro 2015a).

The data was analysed by using various statistical methods. Basic results have been presented by using descriptive measures (e.g. percentage distributions and measures of central tendency and variation). The associations between categorical variables were examined using the traditional chi-square test. Group differences were tested using either independent samples t-test. In addition to statistically significant differences (p-values), effect size measures (Cohen's d) are also reported. The interpretations of Cohen's d-value are quite relative. In this chapter, effect size approximately 0,2 means "small effect", effect size around 0,5 "medium effect" and effect size around 0,8 or more refers to a "large effect" (Cohen 1988, 10).

Results

The assessment concentrated on two areas of mother tongue and literature: on linguistic knowledge and writing competence. All in all, the results were fairly evenly distributed across Finland. Differences between schools were also reasonably small. In linguistic competence, only about 5 % of the total variation was explained by school differences. The corresponding shares in writing were 9 % in printed assessment and 10 % in the digital assessment. Even though the differences in writing are not alarming, they are somewhat larger than those observed in PISA assessments.

Linguistic knowledge

The linguistic knowledge assignments measured how well pupils:

1. Understand that situation and purpose (context) influence the choice of linguistic expression.

2. Recognize different expressions and are able to interpret their meanings within their contexts.

3. Have a good command of standard language norms.

In the digital assignments, the average percentage of correctly completed questions was 51% of the maximum linguistic knowledge score. The score was about 5% lower than that of the printed assessment ($p < 0{,}001$; $d = 0{,}27$). Girls' average score was 56% and boys' 45%. Girls' result was 6 and boys' 5 percentage points lower than the corresponding figures in the printed assessment. The gap between girls and boys was especially notable in the digital version (11 percentage points), and boys' competence levels varied slightly more than those of girls. As in the printed version, the greatest differences between genders were observed in the assignments measuring standard language norms, where girls scored 8 and boys 6 percentage points lower than in the printed assessment (Harjunen and Rautopuro 2015a, 15, 123–125; 2015b).

When examining individual items, the difference between the results of the printed and digital version was the largest ($d = 0{,}52$) in an assignment where the pupils had to click a linguistic form within the text to underline words (a verb form in the perfect tense). Those who failed had either clicked only one of the words of the tense, or else several wrong words. In the first case, the reason for the wrong answer was likely due not only to their linguistic competence but the competence to use a keyboard, a mouse, and a precision different from the pen-and-paper method. If the student was not exact and did not check their answers, it would have been easy to click only once and think that both words were underlined. The second largest difference ($d = 0{,}38$) was in an assignment where pupils had to click a verb, which was in the passive voice in another text.

In contrast, the scores of some assignments were higher in the digital than those of the printed assessment. However, the effect size measure showed the mode effect was not very strong. The result is not a surprise. The tasks were largely the same in both versions but they were primarily planned for the paper (main) version of the assessment. Therefore, the usability of certain assignment types differed from that of the printed one. For example, pupils were not able to see the longer text on a single screen, which may have influenced their overall view of the text. However, while some sections of the linguistic knowledge assignments formed a concrete continuum, and nearly all sections were on a continuum within their context (e.g. an application for a summer job), pupils may have found it more difficult to perceive these continuums in the digital assessment, even though they were reminded of them in each assignment section

(Harjunen and Rautopuro 2015a, 121–144; 163–164). Though, results show that the single tasks worked almost equally well in both versions.

As seen in the table below (14–1), it is easy to see that the results were generally somewhat better in the paper version of the assessment compared with the digital version. The percentage of pupils achieving upper scores was higher in the paper version. This trend seems to be quite similar for both boys and girls. Due to the large sample size, all differences are statistically significant. However, the effect size measure (Cohen's d) shows the mode effect is not very strong. Nevertheless, the mode effect was slightly more pronounced among girls than among boys.

When seperately analyzing pupils, who were aiming at upper secondary education and vocational education, the differences (effect sizes, as well) in learning outcomes in the paper version and the digital version were about the same as shown in the Table 14-1.

Previous research in Finland has shown that the educational background of pupils' parents is strongly connected to pupils' achievements in the assessments of learning outcomes (Harjunen and Rautopuro 2015a, 105–106, 142; Hildén and Rautopuro 2014, 78–81; Rautopuro 2013, 7, 115). Our results show that the higher the level of parents' education, the better the students' results. However, parents' education has no effect on differences in achievements between the paper version and the digital version of the assessment.

Even if there seems to be a seemingly significant difference between the achievements in paper and digital version of the assessments, the phenomenon is not that straightforward: the effect size measure (Cohen's d) shows that the mode effect is generally not very strong when analyzing single tasks.

Table 14-1. Results in linguistic knowledge

	Boys (%)		Girls (%)		Total (%)	
	Paper	Digital	Paper	Digital	Paper	Digital
Under 10%	0,4	1,3			0,2	0,6
≥ 10% to 20%	3,5	6,6	0,7	1,7	2,2	4,2
≥ 20% to 30%	10,6	12,8	2,4	4,8	6,6	8,6
≥ 30% to 40%	19,3	22,0	8,1	11,7	13,9	17,0
≥ 40% to 50%	17,6	16,9	11,3	16,8	14,5	16,8
≥ 50% to 60%	16,8	17,1	16,3	16,6	16,5	16,8
≥ 60% to70%	18,7	14,2	26,3	26,4	22,4	20,3
≥ 70% to 80%	9,1	7,1	20,5	14,6	14,6	11,0
≥ 80% to 90%	3,3	1,5	12,2	6,2	7,6	3,9
≥ 90%	0,8	0,6	2,2	1,1	1,5	0,8
Mean	49,6	45,2	62,6	56,6	55,9	51,0
Standard deviation	17,9	18,1	16,5	16,8	18,4	18,3
p-value	$p < 0,001$		$p < 0,001$		$p < 0,001$	
Cohen's d	$d = 0,24$		$d = 0,36$		$d = 0,27$	

Writing competence

When it came to writing competence, the pupils achieved an average of 57% of the maximum writing score in the digital assignment. Girls' average score was 65% and boys 48%. The results were some 3 percentage points lower than the corresponding figures in the printed assessment. In both versions, the competence gap between girls and boys was large, and boys' competence levels varied slightly more.

Writing skills were assessed on the basis of three assignments: writing an application for a summer job, a rejoinder to a column, and a news item or a description based on a photograph. The two first assignments were designed for this particular evaluation of learning outcomes. In these two assignments, there were no statistically significant differences between the paper and digital version. There were no differences between test modes even when the results were examined by gender and parents' educational background. The assessment criteria for the application and the rejoinder covered the typical features of these genres. Language was also assessed, with two language criteria applied to the rejoinder.

The situation was remarkably different when an old assignment (linking item) was used—The third assignment, writing a description or news item on the basis of a photograph, was included in the 2001 assessment of learning outcomes. This enabled comparisons with earlier results. This particular assignment was originally designed for a pen-and-paper assessment and has now been transformed to a digital platform. In linking items, the assignment and the criterion were to be exactly the same as in the previous assessment. In the case of boys, the 2014 assessment yielded similar results in the printed version and lower results in the digital version to the 2001 assessment. For the assignment, the pupils could make a selection between two alternatives: description and news. The results for this item are presented in Tables 14–2 and 14–3.

Table 14-2. Results in writing "description"

	Boys (%)		Girls (%)		Total (%)	
	Paper	Digital	Paper	Digital	Paper	Digital
Under 10%	3,7	23,9	0,9	7,3	4,6	14,1
≥ 10% to 20%	7,5	14,8	1,2	2,9	4,7	7,9
≥ 20% to 30%	15,7	11,7	3,3	7,6	8,9	9,3
≥ 30% to 40%	8,8	7,4	3,4	6,4	5,8	6,7
≥ 40% to 50%	17,8	14,3	11,0	11,4	13,1	12,6
≥ 50% to 60%	16,9	10,9	14,7	14,3	16,2	12,8
≥ 60% to70%	7,5	5,7	8,1	7,9	8,4	7,1
≥ 70% to 80%	11,2	6,1	20,1	15,7	16,4	11,7
≥ 80% to 90%	8,8	4,8	23,9	16,9	14,6	11,9
≥ 90%	2,2	0,4	13,5	9,6	7,4	5,9
Mean	51,8	33,5	61,4	58,2	57,2	48,0
Standard deviation	24,5	26,0	24,8	27,2	25,2	29,4
p-value	p < 0,001		N.S		p < 0,001	
Cohen's d	d = 0,73		N.S		d = 0.34	

Table 14-3. Results in writing "news"

	Boys (%)		Girls (%)		Total (%)	
	Paper	Digital	Paper	Digital	Paper	Digital
Under 10%	6,3	8,4	4,9	2,7	5,7	5,8
≥ 10% to 20%	5,1	7,4	3,9	3,0	4,6	5,2
≥ 20% to 30%	10,3	14,1	5,4	4,8	8,1	9,7
≥ 30% to 40%	6,7	6,9	5,0	5,8	6,0	6,4
≥ 40% to 50%	17,2	17,2	13,9	15,2	15,7	16,2
≥ 50% to 60%	17,5	15,7	15,8	16,1	16,8	15,9
≥ 60% to70%	9,5	9,0	7,5	9,7	8,6	9,3
≥ 70% to 80%	13,5	12,6	18,1	17,5	15,5	14,9
≥ 80% to 90%	10,7	7,5	18,4	17,7	14,1	12,4
≥ 90%	3,3	1,1	7,1	7,6	5,0	4,2
Mean	51,7	46,4	59,5	61,1	55,2	53,3
Standard deviation	24,5	26,0	24,8	27,2	24,8	24,7
p-value	p < 0,001		N.S		p < 0,05	
Cohen's d	d = 0,22		N.S		d = 0,08	

It is easy to see from Tables 14–2 and 14–3 that the results from the third writing assignment are different than those from linguistic competence (Table 14-1). First, a statistically significant difference was not found among girls between the paper and digital versions of the assessment. Second, in the task of writing a description, the mode effect (d = 0,73 vs. 0,24) for boys is remarkably stronger in comparison with the linguistic competence. The difference was quite strong (d = 0,73) only among boys in the task of writing a description, but small (d = 0,22) among boys in the task of writing a news item. In the description task, the mean result was nearly 20 percentage units lower in the digital version compared to the paper version. Almost one fourth of the boys fell under 10 % achievement in the digital version, while in the paper version less than 4 % of the boys performed so poorly. Also, the percentage of good achievements was remarkably lower in the digital version among boys.

Based on the data of this assessment it is difficult to explain the differences between boys and girls in the digital environment. However, research has shown (e.g. Kaarakainen et al. 2013) that, while the activity to use ICT in Finland is quite the same between boys and girls, there are differences in how they use ICT. Girls use significantly more social media and blog posting than boys. Boys, on the other hand, concentrate more on internet games and programming.

The assessment criteria for the linking item were intended for the pen-and-paper method, for that reason all criteria did not fully suit the writing assessment within the digital environment. Further analysis shows that one of the criterion, based on the demand to plan the text in a separate part of the screen before writing, was not suitable for use with a word processor (d 0.35). The planning process seems to be different in the digital environment: Pupils start to write the text without planning, despite the teacher's instructions. They plan and process the text at the same time they are writing it on the screen (Nordmark 2014, 191–192). The screen seems to function as a space for the externalization of thoughts, and the pupils uses the screen and the keyboard to organize them (Åkerfeldt 2014b).

In the case of the description task, problems occurred with the length of the text: some texts were really short—only one sentence or two—and could neither compose a complete description (d = 0,52) nor illustrate creative vision (d = 0,34). If the text is short, the writer cannot succeed in some other criterion as well, such as "descriptive adjectives, substantives, or verbs", appealing "to at least two senses (e.g. sight and hearing)", or "one's own creative impression". Only 28% of the boys chose the description (38% of the girls).

In both texts, the difference was strong in the criterion "the layout of the text" (d = 0,74 in description; d = 0,44 in news). Many texts were really short or consisted only of a string of sentences, though the platform created possibilities for the different sizes and styles of fonts or separated sections. One reason for this result can be the habit—at least at school—to print out texts and check their lines of thought, structure, and linguistic forms as well as layout on a physical paper copy. Therefore, a digital environment may have presented new challenges to writing insofar as all pupils were not equally familiar with writing texts on a computer (e.g. Pommerich 2004).

It is worth considering that genres, and the relationships between them, change over time, with the conventions of each genre shifting as well. For instance, contemporary news need not only be an event (e.g. an accident)—that always contains a clear description of the situation, time, space of action, reasons and consequences—as the criterion suggested. If a pupil wrote news of a research result, such a text could not fulfill all criterion. The situation would be the same if the news concentrated of a new exhibition. It is noteworthy that if the linking item were disregarded in the overall writing achievement, leaving the application and the rejoinder as the only assignments to be considered, the printed and electronic writing assessments would have practically yielded the same results.

In general, among those pupils who were aiming at upper secondary school, there were no statistically significant differences between the two test modes. However, among those pupils aiming at vocational studies, those that participated in the paper version performed significantly ($p < 0,001$) better in both assignments compared to those participating in the digital version. In the task of writing a description, the effect was quite strong (d = 0,70).

The association of parents' educational background with learning outcomes in two test modes differed from linguistic competence. In the writing description test, there was no difference between the two test modes if both parents had completed the matriculation examination. If only one or neither of the parents had not completed the examination, the pupils who completed the paper version performed significantly ($p < 0,001$; d = 0,40) better. In writing the news, there was a similar ($p < 0,05$) difference between test modes in the group of students whose parents had not completed the matriculation examination.

When more precisely examining the description and news writing assignments, the differences in performances between the paper and digital version varied across the different provinces of Finland. In writing the description, the differ-

ence between the two test modes in favor of the paper version was the largest (23 percentage points), and both statistically ($p < 0{,}001$) and remarkably ($d = 0{,}98$) significant in Southwestern Finland. The difference was also statistically significant in Eastern Finland, and Western and Inland Finland ($p < 0.001$), though the mode effect (difference from 10 to 13 percentage points) was a little smaller ($0.38 < d < 0.48$). In writing the news, the only statistically significant difference ($p < 0{,}001$) was found in the province of Southwestern Finland. The average score for pupils working with the paper version of the assessment was 10 percentage points higher compared with the pupils using the digital version ($d = 0{,}46$).

There could be many reasons for the differences between regions in Finland. There is some evidence that the resources and the use of ICT in schools vary (between regions and within regions). However, systematical research on this has not been done yet.

Discussion

Our study shows that it is very challenging or even impossible to use linking assignments and transfer their criterion directly into digital form if they were originally designed for a pen-and-paper assignment. The use of digital tools highlights and requires a different kind of approach, skills, and competencies than the use of paper and the pencil. The architecture of the assessment tools has to be meticulously designed and developed as well (Neal 2011; Reilly and Atkins 2013). Åkerfeldt (2014a, 87) underlines that digitalization challenges the notion of competence: what kind of skills will be recognized as competencies—or digital literacies (Poe 2013)?

There were major differences in the quality and availability of ICT equipment between the sample schools, and this could account for the differences, explaining some of the confusing results. The students in Eastern-Finland, for example, achieved about the highest results in writing in the pen-and-paper version. In the digital version, the students from that area achieved the lowest scores. Poe (2013) insists that the issues of fairness are particularly important in large-scale digital writing assessments concerning e.g. parents' socio-economical status, educational level and ethnicity, pupil's gender, disabilities, access to and use of digital tools and technology, previous experiences and attitudes towards these tools.

In general, the level of ICT use at school was somewhat low. Teachers in the sample schools chiefly used ICT equipment in the classroom for information

retrieval and the editing and laying out of texts. This fact may explain the result that peer-reviewed scoring of the teacher had a good correspondence in the pen-and-paper version, but the correspondence was much lower in the digital version. The level of the use of ICT does not necessarily imply that the teachers are unwilling to use ICT. The availability and the quality of ICT varies remarkably between schools. It is not the case that all the pupils and teachers have a possibility to use computers and internet in their classrooms. Instead, they have to use separate almost fully booked computer labs. Moreover, the learning materials designed for digital learning environments are diverse.

Unfortunately, very little is known about studying writing in the digital classroom when teaching mother tongue (Finnish) in lower secondary education (Kauppinen et al. 2015). In Finland as well as in Sweden (Nordmark 2014, 247), the research on teaching Finnish has focused on text as a product of writing, not on the processes of digital writing.

All in all, digital assessments are coming to education to stay, and based on our results, there is no reason to fear them. Nevertheless, in the future, pupils must be guaranteed uniform opportunities to use ICT equipment across Finland, in different types of municipalities, and in all schools. Hardware and its use should be reformed and standardized, providing the basis for equality. Teacher training must offer prospective teachers the capabilities for using ICT in teaching and for assessing texts produced online (multimodal texts). Teachers should be offered continuing education in this field. ICT skills are part of modern civics.

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Epilogue

CHAPTER FIFTEEN

THE UNBEARABLE LIGHTNESS OF DIVERSITY-SPEAK: TOWARDS REALISTIC DIVERSIFICATION IN EDUCATION?

Fred Dervin

> "To name things badly is to add to the misfortunes of the world."
> (Attributed to Albert Camus, 1913–1960)

> "You are in the process of being indoctrinated. We have not yet evolved a system of education that is not a system of indoctrination. We are sorry, but it is the best we can do. What you are being taught here is an amalgam of current prejudice and the choices of this particular culture."
> (Lessing 1962, vii)

Introduction

The word "diversity" has become omnipresent in most societal contexts—education especially being a privileged site for its use, misuse, abuse and related indoctrination. According to Wood (2003, 16), 'diversilogues', 'diversidacts' and 'diversicrats' recycle this polysemic word as if it were a magic wand. In this chapter, I problematize the idea of diversity in education by suggesting that it is often a mantra that runs the risk of running its course and adding "to the misfortunes of the world" (e.g. Camus above) if one mistreats it and uses it, at times, as an ideological fiction (Wood 2013). As such, the way the word diversity tends to be used in education often seems to correspond to Ernst Bloch's (1932) non-simultaneity ("Ungleichzeitigheit"), whereby ideological representations[1] of diversity contradict the realities of our world. In his book on diversity, Wood shares a similar argument when he writes: "The gulf between *the real diversity* of the world and *the artificial and often imaginary diversity* of our social experiments is very large (29)" (my emphasis).

The term "diversity-speak" is used in this chapter to refer to such assumptions and misconceptions about diversity. To give a short illustration, let me refer to a few years ago, when I joined a Nordic research group called "Diverse

Teachers for Diverse Learners". When I attended the first meeting (with other White-only scholars), I patiently waited for the word "diverse" to be defined by the group leaders, but in vain. At the end of the day, I asked the group what meaning(s) we were supposed to give to the word. After a few seconds of silence, I proposed a hypothesis: If we had gotten together 10 years earlier, the group would have been called "Migrant Teachers for Migrant Learners". The participants all nodded to each other to confirm…

This kind of diversity-speak is leading to the (dangerous) imagineering (imaginary + engineering) of today's world, and education. This is why a critical stance is needed to strengthen the word "diversity"—or even to discard it! In what follows, I review certain assumptions about the word and the consequences they have on the individuals the word is meant to cover. The following questions are asked: Who is diverse? What does it mean? Who is included or excluded in the label? Who has the power to be or not to be included in the label? Who has the right to reject the label for themselves? Who decides? What really hides behind the word diversity in ideological terms?

Questioning diversity-speak

> "A name is merely the guest of reality".
> (Chuang-Tzu, 4th BCE)

In what follows, I review assumptions about diversity, as identified in the field of education (via literature and discussions with researchers, students, and practitioners), and their consequences. My context of reference is that of the Nordic country of Finland, where the word is currently very much in use. I also use illustrations from other contexts to show that it is, in a sense, a global phenomenon. I start by examining three problematic assumptions about diversity ("anthropomorphy", "essentialism-othering", and "marketing") and then I discuss the consequences these have on educational actors. Far from being independent from each other these all tend to overlap to create "diversity-speak". The unbearable lightness of the latter, contained in the following assumptions, clearly point to the fact that diversity is often a constructed, manufactured, and invented object and that there is a need for educators, researchers and decision makers to question their own assumptions about it, instead of taking it for granted and using it as if it were commonsense.

Assumptions about diversity

Diversity as "anthropomorphy". According to Merriam Webster, "anthropomorphic" refers to ascribing human characteristics to nonhuman things (here, the concept of diversity). The word diversity is often used as a substitute to talk about certain individuals or groups of people. For instance, one often hears of course titles, programmes, or books entitled "diversity in education", "teacher education for diversity", "the benefits of diversity", "preparing for diversity", etc. In these labels people disappear behind the anthropomorphy of diversity. This somewhat empty and confusing use tends to refer to the "other" and becomes a substitute for e.g. immigrants and representative of minorities. The anthropomorphication of diversity (through which subjects disappear and become objectified) often serves as a façade or a politically/interculturally correct way of including the other in "our" education.

Diversity as "essentialism and othering". Because of the anthropomorphic function of the word diversity, it can easily become a straightjacket for some individuals and groups.

In her book *The Essential Child: Origins of Essentialism in Everyday Thought*, Gelman (2003, 3) defines essentialism as "the view that categories have an underlying reality or true nature that one cannot observe directly but that gives an object its identity". In other words, essentialism makes us believe that individuals and groups have "essences" that dictate who they are, how they behave, and what they think. In current educational research, many problematic methodological -isms related to diversity-speak have been identified: Nationalism (the Nation-State as an essence), West-Eastism (the imaginary dichotomy of East and West as a categorizing element), linguism (languages as solid identity markers), skin-colourism (skin colour as the only means of identifying someone) and culturalism (culture as an explanation for all). Apropos skin-colourism, the cut.com website contains videos of white people having to guess the origins of a panel of Asian-looking individuals. While some of the white participants could easily justify their choices by falling into the trap of essentialism, claiming that "He is probably Chinese… look how smiley he is… he is so positive all the time" or "I went to Thailand and I had a Thai massage from someone who looks like her", other participants disliked the exercise explaining that "I don't feel comfortable labelling you all", "I can't do this I feel weird" or "They are probably all Americans".

Culturalism is probably one of the most studied forms of essentialism today. Using culture as an explanation for what some people do or say can easily lead

to essentialism (Dervin and Machart 2015). For Holliday (2011, 39) "the description of culture is ideological, and the (…) claim to scientific neutrality and objectivity comprise a naive denial of ideology." As such describing "diversity" through references to "their" culture is very flawed and, as Hoskins and Sallah (2011, 114) defend, this can too easily "hide unequal power relations, included poverty, violence, structural inequalities such as racism and the possibilities of multiple identities". In other words, should problems between "us" and "them" arise, it is not "our" fault but their culture's. Culturalism also sets up artificial boundaries between "us" and "them" by overemphasising generic cultural difference.

"Diversity as essentialism" has a lot of influences on pedagogical practices and needs to be counter-attacked. Luke (2010, 61) proposes to shift to an understanding of diversity that engages with "difference within difference" instead of "generic pedagogies for homogeneously defined cultural subjects".

Politically motivated and intertwined with essentialism, the othering function of diversity labels the other as "an other", "as if without a tag they wouldn't be human" (Kureishi 2003, 24). These others are often thrown into the stereotypical iron cages of foreignness, culture, language, and religion by institutions which cannot always see beyond the "other"/"us" wall that they have created. One interesting example is the insistence on labelling "Chinese" heritage children as representatives of Confucianism, the system of philosophical and ethical-sociopolitical teachings by Confucius from the 6th–5th century BCE (Breidenbach and Nyiri 2009).

Finally, while some people are labelled "diverse" in our schools and educational research (i.e. economic immigrants and refugees), others are given the ideologically different titles of "citizens of the world", "cosmopolitans", "multinationals", and "Third Culture Kids" (Benjamin and Dervin 2015). Who decides who falls into these different labels? Skin colours, socio-economic positions, religions and an intersection with gender often dictate such uses and abuses.

Diversity as "marketing". Diversity is often used as a marketing tool and strategy in education, and is politically motivated. The metaphor of people of different races, cultures, and religions holding hands, dancing around planet earth has become an international symbol for selling diversity. A "social mix ideology" (Hollingworth and Mansaray 2012) can thus represent a potential selling point to students and parents: by the very presence of the diverse other they will learn to be "cosmopolitan", "intercultural", "global"… and increase their intercultural capitals. Kirkham (2016) shows how some schools in the UK base their

marketing strategies on diversity to attract both minority ethnic students and White middle-class students. References to diversity (especially quantitatively, by listing nationalities and languages) can also bring more "points" to institutions that play the game of international rankings. A demonstrated strategy of welcoming diversity within an institution can also boost its reputation amongst decisionmakers—and secure more funding. This is certainly the case, for instance, for the European Union, which provides higher education institutions "catering" to international/mobile students with more funds and "points".

Consequences of assumptions about diversity

Diversity as an alibi/excuse. The aforementioned assumptions about diversity often have consequences for the one(s) labelled as diverse. I have characterized them as alibis/excuses. Questions and discourses about origins, languages, religions, cultures, etc. often serve such purposes. For example, in an interview with an Al-Jazeera journalist, writer and photographer Taiye Selasi (2015), of Nigerian and Ghanaian "origin", born in England, and who has lived in the USA and Italy, explains why she dislikes the question "where do you come from?": To her this question often serves the purpose of questioning one's presence somewhere. She argues that behind it hides the code for "why are you here?"— a code for "a lot of other conversations that are a lot more difficult to have" (2015). Her position as an other, the "diverse" other, leads the majority to make assumptions about her reasons for being at a specific location, asking her to justify her presence.

Another form of alibi/excuse is when diversity is othered to manipulate or to boost "our" own ego. This is the case in the following excerpt from Xiaolu Guo's (2007) novel *A Concise Chinese-English Dictionary for Lovers*. As an immigrant to England, Chinese X. struggles with the English language, "culture", and an intercultural relationship with a bisexual English boyfriend. On one occasion, her unfaithful boyfriend has planned a sexual encounter with a man and thus wishes his Chinese girlfriend to be away. He thus suggests she travels around Europe for a few days. Here is how he tries to convince her to go on a journey:

> "In the West we are used to loneliness. I think it's good for you to experience loneliness, to explore what it feels like to be on your own. After a while, you will start to enjoy solitude. You won't be so scared of it anymore" (2007, 222).

Excuses/alibis are to be found in this excerpt. One can read a usual form of East-Westism whereby the West is constructed as being more autonomous, independent, and less "groupal" than the East—an ideology which is so common and rarely questioned that it alone should convince the Chinese girlfriend (e.g. Holliday's 2010 discussion on the dichotomy of individualism vs. collectivism). The questionable behaviour of the boyfriend does not come into the picture, the "blame" is on the diverse other. Breidenbach and Nyiri (2009) have shown in their work many other convincing instances of diversity used as an alibi/excuse.

Diversity as hierarchisation leading to unsuspected exclusion. Since the 1990s, the word diversity has been used in a positive sense to refer to the inclusion of so-called minorities in postmodern societies (race, gender, etc.). As asserted earlier, the word itself is often used as a positivizing substitute for certain individuals/groups. By using such a term to refer to the other, one assumes implicitly the opposite side of diversity: less diversity, uniformity, sameness, similarity, etc. which are used to describe the majority. Interestingly, one often hears that "Finland is a very homogeneous country", referring to the fact that Finland's racial make-up is mostly white—although this is not true anymore. However, this entirely disregards the fact that Finnish society is extremely diverse in terms of gender, sexual orientation, religion, social class, political sympathies, etc. By hierarchizing locality (homogeneous Finns) and the "newly-arrived" diversity represented mostly by selected and selective ethnic, linguistic, and religious diversity, one gives to the word diversity a specific meaning, which can easily contribute to the "evils" described in this chapter.

The previous assumption leads me to the notion of exclusion. For the sociologist de Sousa Santos (2012, 214), "the world is diverse, but it is not equally diverse". Most discussions around diversity are conjugated with the notions of inclusion and social justice. However, through the misguided assumptions presented hitherto, diversity-speak often leads to exclusion in education—nolens volens. The insistence on boxing the other in "his"/"her" diversity (the origin of which many educators/researchers choose themselves) can easily exclude the other and force her/him to accept defeat. Although the two following excerpts are derived from fiction, I have witnessed such misadventures in Finland on many occasions:

> "When I was nine or ten a teacher purposefully placed some pictures of Indian peasants in mud huts in front of me and said to the class: 'Hanif comes from India.' I wondered: Did my uncles ride on camels? Surely not in their suits? Did my cousins, so like me in other ways, squat down

> in the sand like little Mowglis, half-naked and eating with their fingers?" (Kureishi 1996, 73)
>
> "- Good morning class
> - Good morning Mrs Wilkins
> - Class, before we begin, I would like to announce we have a new-comer all the way from China
> *(I was born in Hackney[2])*
> Her name is…" (PP Wong 2014, 28)

By being othered, and relegated to other locations (India/China) and (imaginary) times, the two students are excluded from the space and time of the classroom.

Just as important is the constant exclusion of "complex" diversity (vs. façade folkloric diversity) in school subjects. For instance, in discourses of democracy, capitalism, and even romantic love, "our" education often excludes the other and unfairly claims the invention of these elements. The anthropologist Jack Goody calls this act of exclusion *The Theft of History* (2006). Since the approval of the Universal Declaration of Human Rights (UDHR) by the United Nations General Assembly in 1948, discourses on Human Rights have become prevalent in education and are often constructed as "our" invention. However, in order to avoid certain "centrisms", such as historiocentrism or Eurocentrism, we need to remind ourselves that Human Rights also have a "historical life" (Beitz 2011, 2). For instance, the Cyrus Cylinder from Persia, dating back to the 6th century before our common era, which promoted harmony between different people and faiths, has often been described as a first symbol of universal Human Rights (Mitchell 1988, 83).

Hitherto, what I have attempted to show is that the other's diversity is often "our" diversity, that is, we decide who is diverse, what "their" diversity entails, and how "they" should thus be treated. Undemocratic, these behaviours also deserve to be deconstructed. For example, the current obsession with "saving" "their" language, "their" culture by forcing diverse students to learn/cultivate their heritage can often be counter-productive if it is not negotiated fairly with those concerned. Many white teachers and researchers, living in their own world of privilege, assert, based on a few unconvincing studies, that this is essential for diverse students' "identity" to connect with their "cultural group". While there might be some reality in this (depending on how one conceptualises identity; e.g. Cho 2014) I worry about the fact that this is often done based on a monolingual approach (one child = one language) and at the expense of learning seriously

the "powerful" language of the space and place that could empower "diverse" children (Cho 2014.). I am also concerned about the current essentialistic belief about specific children from specific "cultures" having to learn in specific ways, in respect of their diversity—while the vast majority of these children have never visited "their" country/culture (e.g. Holliday 2010, about the Chinese).

Diversity as separation. There is a clear differentialist bias in discourses of diversity in education; The other is always said to be separated from "us" by a different culture, language, religion, etc. One of the main reasons for this is that educators and researchers feel they have to compare "their" people and the others. Comparisons are inherent to social encounters but they are increasingly problematic if one does not reflect on the ideologies that go with them. Comparisons can lead to explicit/implicit moralistic judgments; they can easily give the impression that someone is better than (an)other (less civilized?); comparisons with diversity often accompany unjustified ethnocentrism (whereby one believes one's culture or group is better); and, finally, comparisons can close the door to outsiders. Although difference matters for everyone, it is important to look at diversity from the continuum of difference-similarity. The following excerpt, from one of the novels mentioned earlier, depicts the lament of an English-born child of Chinese parents concerning this issue:

> "I start to daydream about what it would be like to grow up in a country where I am not seen as different. Somewhere where I am popular and don't have to explain my name or that I'm Chinese. It would be a really cool place where Asians and Jamaicans are just seen as doctors, schoolgirls and businesswomen. Not the 'Chinese doctor', 'the Asian school girl' or the 'black businesswomen of the year'. It would be a country where I was not seen as 'ethnic' or 'exotic' but just 'me'. That would be great!" (PP Wong 2014, 34)

Diversity as hostipitality. The previous consequences show that there can be a power imbalance between the one considered diverse and the rest—with the diverse other being relegated to the position of a mere guest, even if s/he was born in the country in question. This imbalance is reminiscent of critical discussions about hospitality (Dervin and Layne 2013). The philosopher Derrida argues that the idea of hospitality ("genuine hospitality") means that the host has to give up security and authority and become "the hostage" to the guest (Derrida 2000, 16). This is of course impossible as it would lead to "welcoming the infinite" (Derrida 2000, 14). Hospitality cannot thus be conceived without hostility and vice versa: There is no hospitality without power imbalance as it is based on rights, duties,

and obligations (Derrida 2000, 4). Guests are always "under control" (e.g. limits upon where she/he can go) and, through her/his status as guest, relinquished to the identity of the "Other". The host can decide who enters, what the guest is entitled to do, say, or even think. So there is also symbolic violence in hospitality: the guest is at the mercy of the host and should she/he not wish to do or speak as she/he is told, hostility can easily emerge (Derrida 2000, 4). Hospitality can thus become inhospitable and prone to hostility. In the field of education, many words and phrases related to diversity hint implicitly at *hostipitality*. For instance, the word "tolerance" does just that to the other. Calls for tolerating diversity can appear to be very patronizing as they establish a hierarchy between us and them. We may want to tolerate, but we still believe that we are better than the other; the diverse other still has to bow in front of our wish for him/her to be and think like us.

Discussion and conclusion: Towards Realistic and Fair Diversification

> "People in this culture are not very gifted for learning languages. They do not even care about their own language".
>
> (Heard at a Finnish school from a so-called "multicultural teacher")

This chapter has discussed the following assumptions often made about diversity and their consequences in education:

- Diversity as anthropomorphy
- Diversity as essentialism and othering
- Diversity as marketing
- Diversity as an alibi/excuse
- Diversity as hierarchisation leading to unsuspected exclusion
- Diversity as separation
- Diversity as hostipitality

The points above have consequences on educational actors, especially those who are in powerless positions. In a world where there are clear indications that

the boundaries between "the normal and the abnormal, the expectable and the unexpected, the ordinary and the bizarre, domesticated and wild" are blurred, as are those between "the familiar and the strange, "us" and the strangers" (Bauman 1997, 25), it is important to look beyond a solid and static view of diversity and to start looking into diversities or the diversification of all, i.e. "diversities within diversity". Talking about his Muslim family, author Mohsin Hamid explains:

> "I have female relations my age who cover their heads, others who wear mini-skirts, some who are university professors or run businesses, others who choose rarely to leave their homes. I suspect if you were to ask them their religion, all would say 'Islam'. But if you were to use that term to define their politics, careers, or social values, you would struggle to come up with a coherent, unified view" (2014, 31).

Thus, if I am ready to understand, discuss, and accept that I am also myself diverse, then I might be more willing to accept the diversification of the other. This could also make education a context where hierarchies, hostipitality, and power relations between diversities are lowered. Diversity might appear purely different and separate but one cannot escape the potential similarities between "us" and "them" as well. Introducing the continuum of difference-similarity into our schools is a necessity in a world obsessed with (cultural, linguistic, religious) difference only. Recently, Maffesoli and Strahl (2015, 12) have suggested that the too often represented "unfillable" gaps between the "diverse" and the "universal" are a thing of the past and that we should instead look more seriously into the reality of "unidiversalism" (a portmanteau word composed of "universal" and "diverse") that our world is increasingly witnessing.

To summarize, I feel it is thus important to continue problematizing our use of the word diversity, and to avoid using it as a meaningless substitute for "people". We also need to be weary of using it to "other" the powerless and to place ourselves ex-/im-plicitly on a pedestal (see the quote overheard from a teacher at the beginning of this conclusion). Educators thus need to develop critical and reflexive skills that could allow them to listen to how the "other" and 'self' are constructed, to learn to deconstruct and to reconstruct them in a fairer way.

Notes

[1] Ideology is understood here as "ideas, discourse, or signifying practices in the service of the struggle to acquire or maintain power" (Woolard 1998, 7).

[2] A north east London Borough, UK.

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